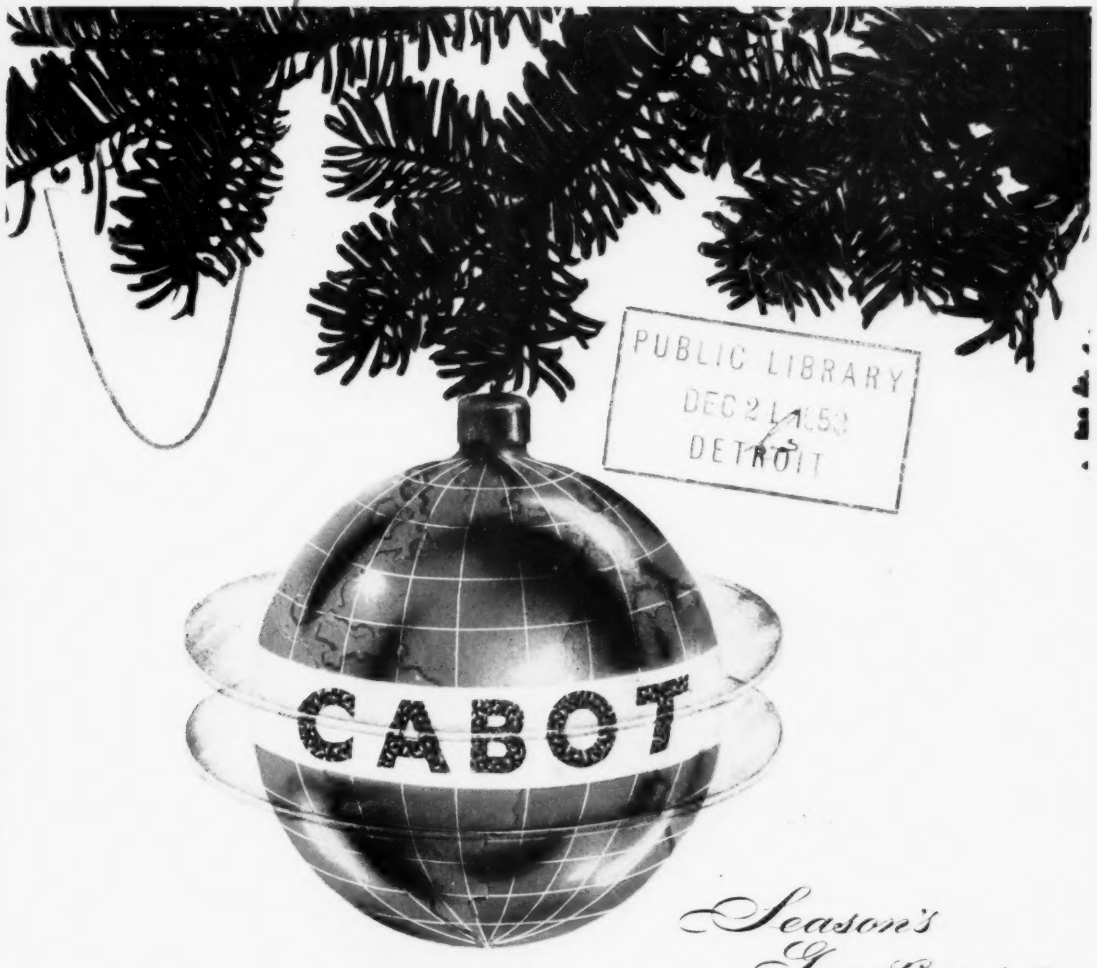
INDIA RUBBER WORLD

OUR 65th YEAR

A BILL BROTHERS PUBLICATION

DECEMBER, 1953



Season's Greetings

GODFREY L. CABOT, INC., Boston

India Rubber World, December, 1953, Vol. 129, No. 3. Published monthly by Bill Brothers Publishing Corp. Office of Publication, 1309 Noble Street, Philadelphia, Pa., with Editorial and Executive Offices at 386 Fourth Avenue, New York 16, N. Y., U.S.A. Entered as Second Class Matter at the Post Office at Philadelphia, Pa., under the act of March 3, 1879. Subscription United States and Mexico, $5.00 per year; Canada $6.00; All other Countries $7.00; Single Copies 50 cents. Address Mail to N. Y. Office.

News about

B. F. Goodrich Chemical *raw materials*

Improve and save on your rubber processing with Good-rite Vultrol

®REG. U. S. PAT. OFF.

Vultrol

...PROTECTS AGAINST SCORCHING
...PERMITS UNINTERRUPTED PRODUCTION
...REDUCES "DEAD" STOCKS
...REQUIRES NO SPECIAL HANDLING

Good-rite Vultrol offers you many advantages for rubber processing. It is ideal for preventing scorching not only during the hot weather months—but the year round. It retards scorch at processing temperatures, and also acts as a mild activator at curing temperatures.

Check these additional Vultrol advantages. It is beneficial on heavy-loaded or highly-accelerated compounds, and is particularly effective with high abrasion furnace blacks.

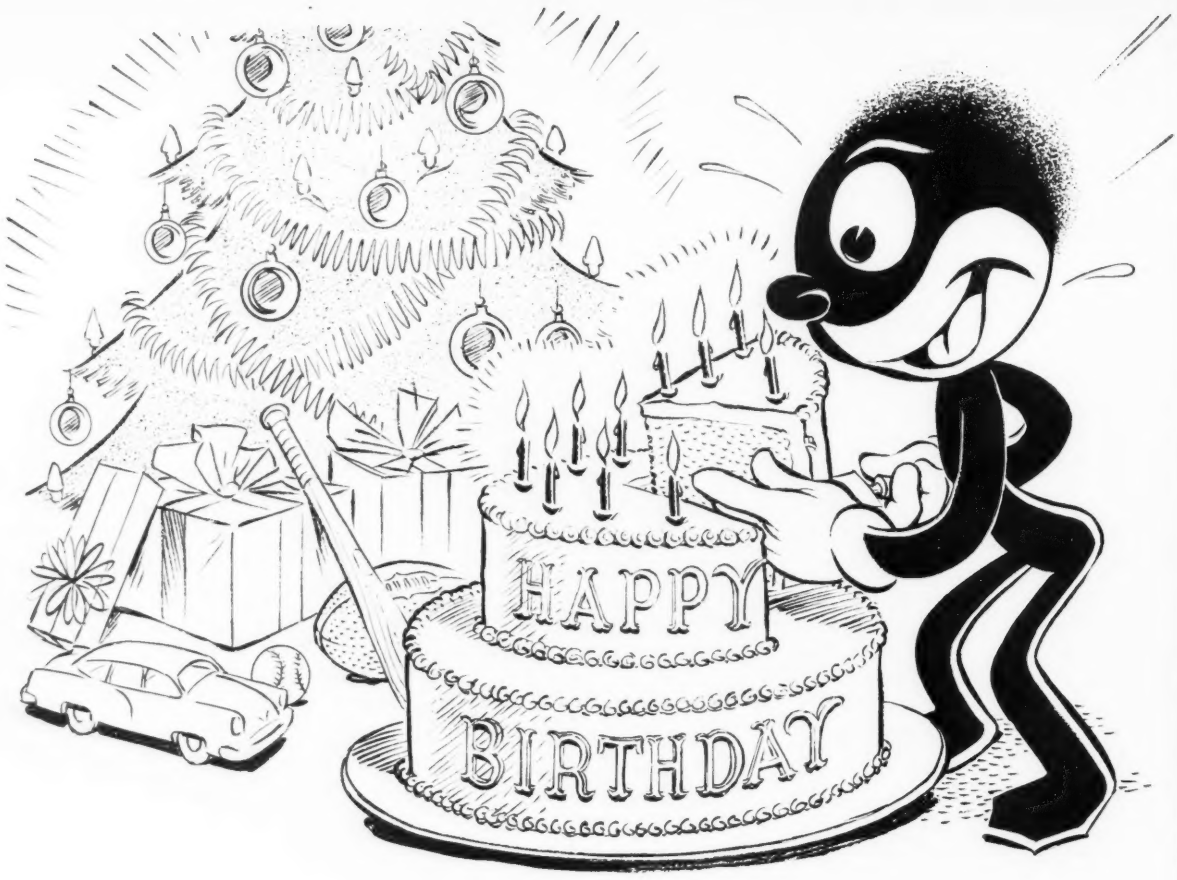
Supplied as a free-flowing flake, Vultrol requires no special handling. It is most effective when added to the latter stages of mixing. Economical and easy to use. Saves time, money and labor! For further information about Good-rite Vultrol, please write Dept. HA-12, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

B. F. Goodrich Chemical Company
A Division of The B. F. Goodrich Company

Good-rite *Rubber Chemicals*

REG. U. S. PAT. OFF.

GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers • HARMON organic colors



First oil furnace black—**Philblack* A** *is 10 years old on Christmas Day!*

Goodness gracious, how this baby has grown! Phillips research made possible, in 1943, the first oil furnace black. And Philblack A, and his brothers O, E, and I, have been making tremendous strides ever since! Today, all over this country and abroad, too, the Philblacks are being used to make better rubber products, more reasonably and more easily than was ever possible before!

Philblack A is specially renowned for easy processing; smooth, fast extrusions; accurate moldings! For information about the whole famous Philblack family, consult our technical sales representative or write our nearest office.

PHILLIPS CHEMICAL COMPANY

PHILBLACK SALES DIVISION

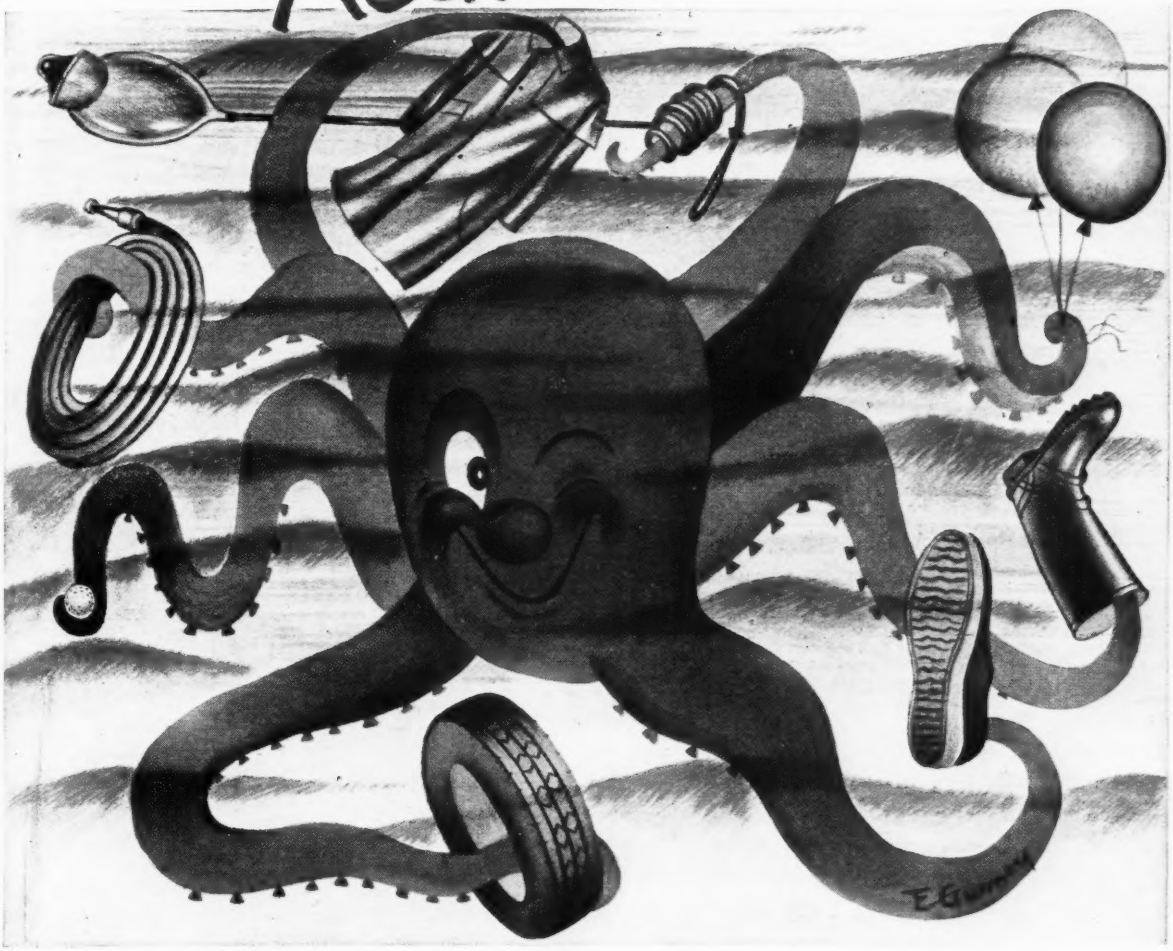
318 WATER STREET · AKRON 8, OHIO

PHILBLACK EXPORT SALES DIVISION · 80 BROADWAY · NEW YORK 5, N. Y.

* A Trademark

The Philblacks are manufactured at Borger, Texas. Warehouses in Akron, Boston, Chicago, and Trenton. West Coast agent: Harwick Standard Chemical Company, Los Angeles. Canadian agent: H. L. Blachford, Ltd., Montreal and Toronto.

Here's *Real* performance control!



If you've ever wished you had the arms of an octopus for controlling rubber quality, better turn to Naugatuck.

With the world's most extensive line of rubber chemicals, Naugatuck Chemical offers you the following materials, for complete control of your rubber product performance.

PROCESS—LAUREX*, activator • KRALAC* A, high styrene resin • BWH-1, plasticizer • E-S-E-N, retarder • TONOX*, rubber toner • CELOGEN, blowing agent for rubber and plastics.

ACCELERATE—THIAZOLES—M-B-T • M-B-T-S • O-X-A-F... THIURAMS—MONEX* • TUEX* • ETHYL TUEX* • PENTEX*... DITHIOCARBAMATES—ARAZATE* • BUTAZATE* • ETHAZATE* • METHAZATE*... ALDEHYDE AMINES—BEUTENE* • HEPTEEN BASE* • TRIMENE BASE*... XANTHATES—C-P-B* • Z-B-X*... SPECIAL ACTIVATORS—D-B-A • G-M-F • VULKLOR • DIBENZO G-M-F.

PROTECT—ANTIOXIDANTS, protection against heat, oxygen, and flexing fatigue—AMINOX* • ARANOX* • B-L-E*-25 • FLEXAMINE • BETANOX* SPECIAL • OCTAMINE.

SUNPROOF*, protection against light and ozone.

For the chemicals *you* need for the quality you want, get in touch with Naugatuck Chemical today.

**Registered U. S. Patent Office*

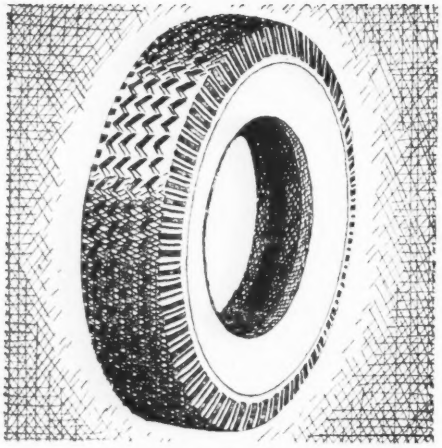
Naugatuck Chemical

Division of United States Rubber Company

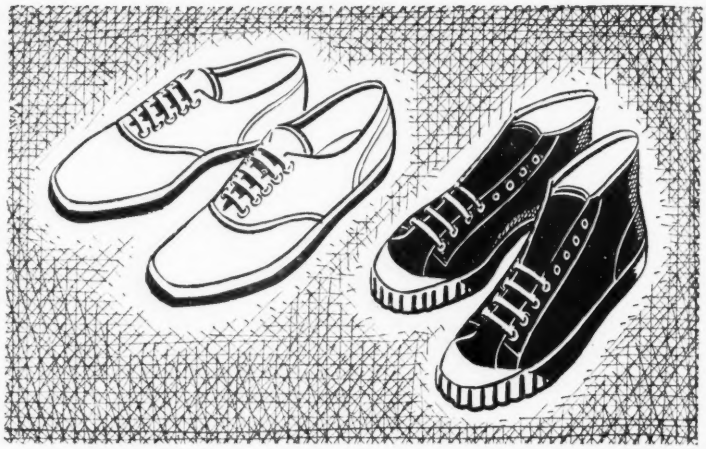
1312 ELM ST., NAUGATUCK, CONNECTICUT

IN CANADA: NAUGATUCK CHEMICALS DIVISION • Dominion Rubber Company, Limited, Elmira, Ontario

Rubber Chemicals • Aromatics • Synthetic Rubber • Plastics • Agricultural Chemicals • Reclaimed Rubber • Latices

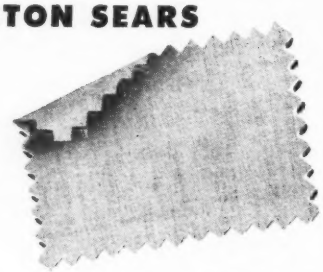


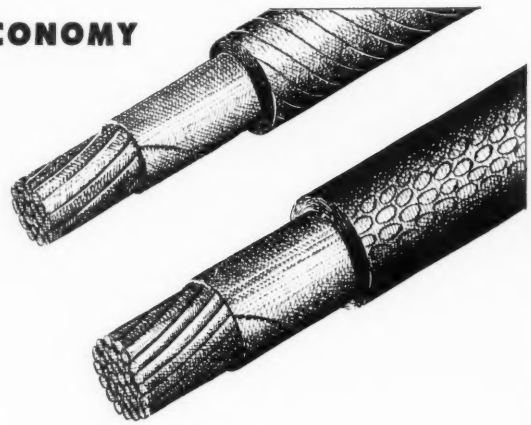
Woven for strength and abrasion resistance, chafer duck is typical of Wellington Sears reinforcing fabrics.



Wellington Sears rubber footwear fabrics include sturdy, economical and easily adhesive enameling duck for tennis and gym shoes and other rubber footwear.

YOU GET UNIFORM QUALITY AND ECONOMY WITH WELLINGTON SEARS COLUMBUS SHEETING



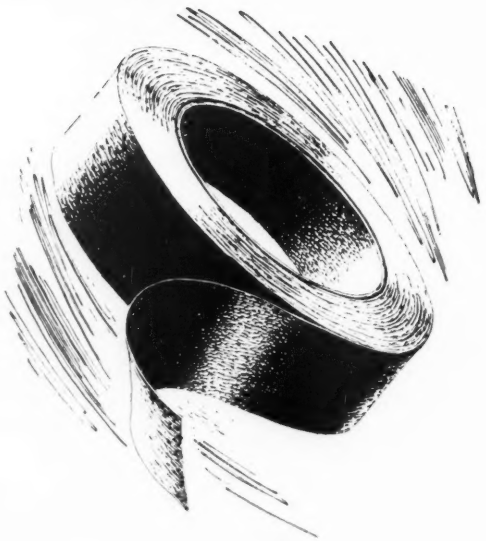


Matching quality, yard after yard, is the basis for Columbus sheeting's long-standing reputation in rubber fabrication. Lightweight and economical, it is carefully woven to yield an absolute minimum of rubberizing process rejects.

These sheetings are made 40 to 120 inches wide in weights from 2 to 5 ounces per square yard. For submarine and other cable wrapping . . . friction tape . . . heavy duty raincoats . . . hospital sheeting . . . Columbus sheeting has versatility to equal its uniformity.

Other cotton, synthetic, and blended fabrics available from Wellington Sears for coating, specialties, and mechanical rubber goods are listed at right. If it's a rubber-and-fabric problem, talk it over with Wellington Sears.

Write for your free copy of "Modern Textiles for Industry" which includes pertinent information on rubber applications. Address: Wellington Sears Co., Dept. K-4, 65 Worth St., N. Y. 13.



Superior Fabrics for the Rubber Industry

- Belting duck
- Hose duck
- Enameling duck
- Army duck
- Single and plied-yarn chafers
- Sheeting
- Airplane cloth
- Balloon cloth
- Nylon, high tenacity rayon, other synthetics and combinations.

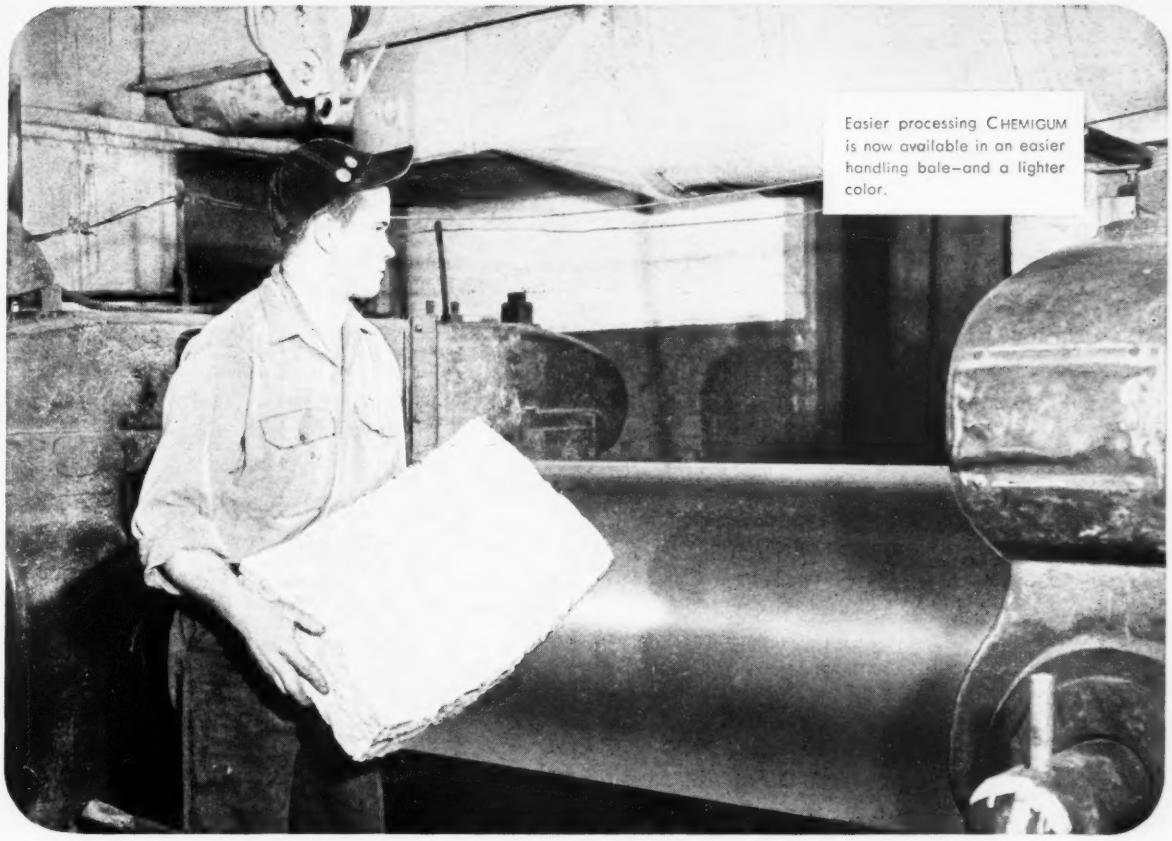
Wellington Sears

A SUBSIDIARY OF WEST POINT MANUFACTURING COMPANY

FIRST In Fabrics For Industry

WELLINGTON SEARS COMPANY, 65 WORTH STREET, NEW YORK 13, N. Y.

Offices In: Atlanta • Boston • Chicago • Detroit • Los Angeles • New Orleans • Philadelphia • San Francisco • St. Louis



NOW—LIGHTER COLORED CHEMIGUM

in a lighter weight bale

BASICALLY the same, yet visibly different are two new types of CHEMIGUM—Goodyear's easier processing nitrile rubber.

CHEMIGUM N6 and CHEMIGUM N7 are the same basic polymers as their respective forerunners, CHEMIGUM "30" N4NS and CHEMIGUM "50" N4NS. After-polymerization process changes give you these new, oil-resistant rubbers in a much lighter—almost white—color and in a much lighter—50 pound—bale.

Now, you can add new ease in handling and new possibilities in compounding to the established advantages of use-proved CHEMIGUM. CHEMIGUM is the easiest processing of the nitrile rubbers. You get faster "breakdowns" easier. And you get them with physical, chemical and electrical properties that equal or surpass those of any similar rubbers.

With the new CHEMIGUM, you can meet virtually any specification for oil-resistant compounds easily and profitably. Just try it and see. For details, write: Goodyear, Chemical Division, Dept. L-9418, Akron 16, Ohio.

CHEMICAL GOODYEAR DIVISION

Chemigum, Pliobond, Pliolite, Pliovic—
T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

We think you'll like THE GOODYEAR TELEVISION PLAYHOUSE—every other Sunday—NBC TV Network

Use-Proved Products—CHEMIGUM • PLIOBOND • PLIOLITE • PLIOVIC • WING-CHEMICALS—The Finest Chemicals for Industry

BLACK PICTURE of product failure is this badly discolored vinyl upholstery trim. You can stop such degradation from the start by using heat- and light-resistant PLIOVIC.

LONGER PRODUCT LIFE

—at lower cost, comes with PLIOVIC

BIG, built-in advantage of PLIOVIC—Goodyear's easy-processing, polyvinyl chloride resin—is its exceptional heat and light stability.

This unusual resistance of PLIOVIC to degradation spells longer life at lower cost for your product. You can use less stabilizer. You can use cheaper stabilizers. You can formulate simpler compounds easier. And you can do this with less danger of product failure.

The added stability of PLIOVIC also permits greater latitude in processing time and temperature, full development of product color and safe re-use of scrap and tailings.

Exceptional stability, ease of processing and excellent physical properties are just some of the reasons for using PLIOVIC in your product. The full story—in the form of a new, technical manual—is yours simply by writing to: Goodyear, Chemical Division, Akron 16, Ohio

We think you'll like "THE GREATEST STORY EVER TOLD"
every Sunday—ABC Radio Network
THE GOODYEAR TELEVISION PLAYHOUSE
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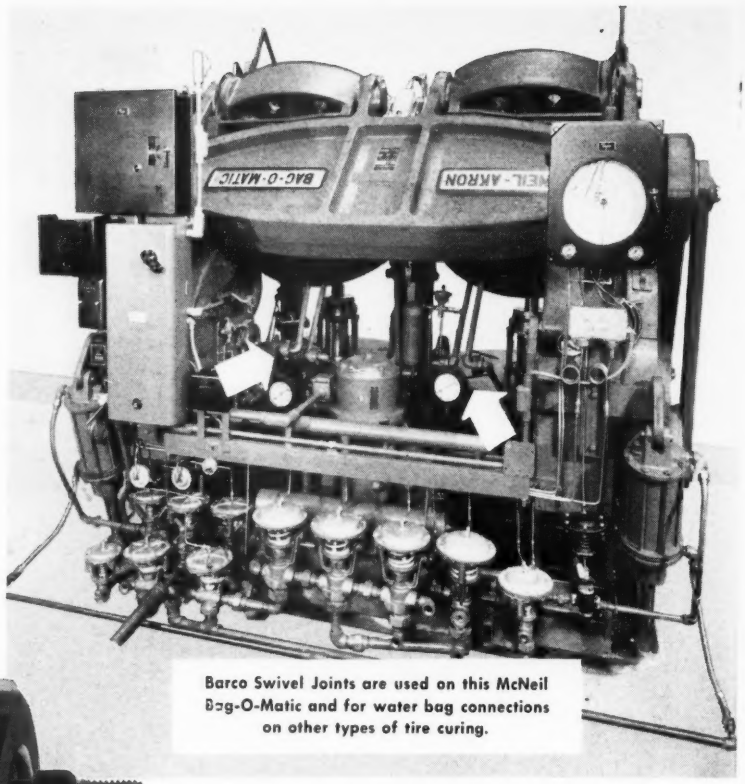
CHEMICAL GOODYEAR DIVISION

Chemigum, Pliobond, Pliolite, Plio-Tuf, Pliovic—T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

Use-Proved Products — CHEMIGUM • PLIOBOND • PLIOLITE • PLIO-TUF • PLIOVIC • WING-CHEMICALS — The Finest Chemicals for Industry

EVERY ENGINEER *will want a copy of this* NEW BULLETIN



Barco Swivel Joints are used on this McNeil Bag-O-Matic and for water bag connections on other types of tire curing.

IT'S easy to get the right answer for even your most special steam, air, or hydraulic *piping jobs* when you use this new engineering catalog on BARCO SWIVEL JOINTS. It is complete with pictures and diagrams showing correct application and contains all specification data for *improved* Barco Swivel Joints:

- Leakproof! Perfect Sealing—Hot or Cold.
- No Binding, Low Torque! Trouble-free.
- Self-Aligning! Simplifies Installation.
- No Lubrication Required! Easy Maintenance.
- Economical! Wide Choice of Sizes and Styles.

SEND FOR A COPY OF NEW CATALOG NO. 265A AND INSTALLATION DRAWING 10-52804.

IMPROVED BARCO *Swivel Joints*

FOR TIRE MOLDS, PLATEN PRESSES

DEPENDABLE, TROUBLE-FREE PERFORMANCE — time after time—has been the one big reason for using Barco Swivel Joints in flexible piping connections and dog-legs on tire molds and platen presses used in the rubber industry. And now Barco offers even *better* performance and service, not only for new uses, but for thousands of existing installations.

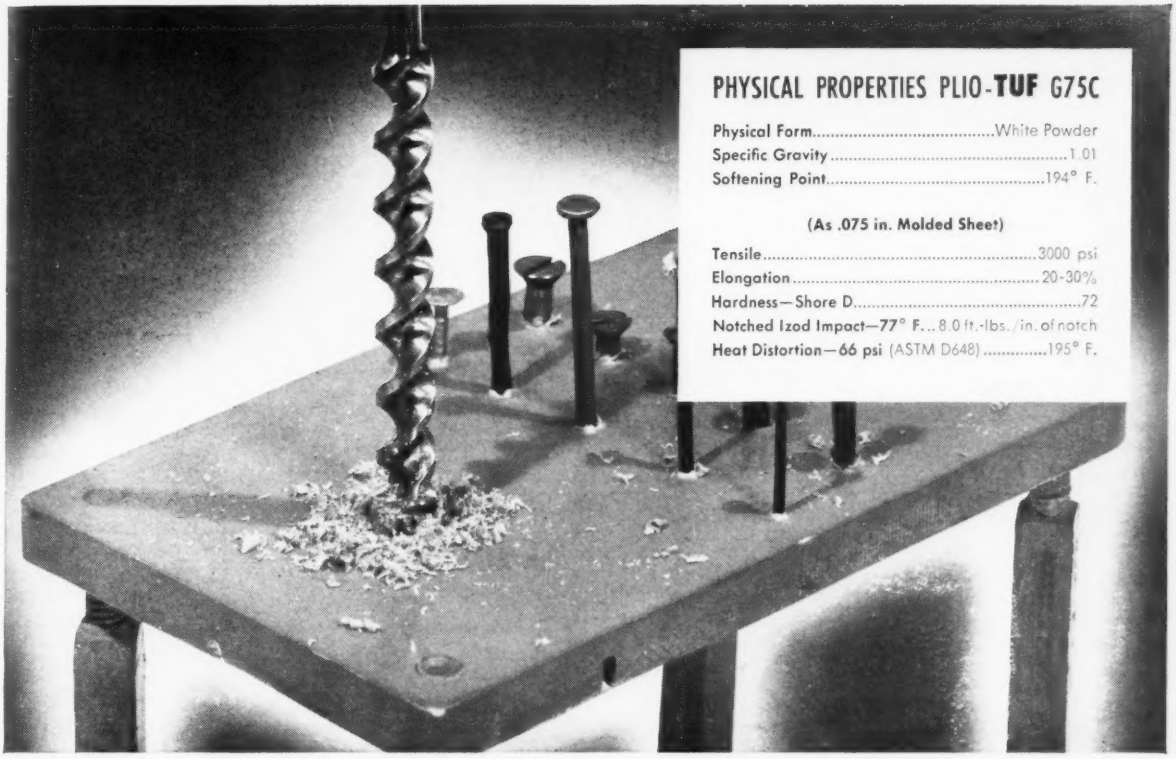
The ANSWER is Barco's new, chemically inert No. 11 CT gasket. No other material is as amazingly long wearing and versatile. Even under most adverse conditions, joints maintain their seal, hot or cold, working or idle — with lower torque and no lubrication required. Natural operating action keeps the hemispherical ball of the joint lapped to a perfect fit.

Get this *advanced performance* in new Barco Swivel Joints! Send for complete information on MODERNIZING old joints!

BARCO *Manufacturing Co.*

510N Hough Street, Barrington, Illinois
In Canada: The Holden Co., Ltd.
The Only Truly Complete Line of Flexible Ball, Swivel, Swing and Revolving Joints

FREE ENTERPRISE—THE CORNERSTONE OF AMERICAN PROSPERITY



PHYSICAL PROPERTIES PLIO-TUF G75C

Physical Form	White Powder
Specific Gravity	1.01
Softening Point	194° F.

(As .075 in. Molded Sheet)

Tensile	3000 psi
Elongation	20-30%
Hardness—Shore D	72
Notched Izod Impact—77° F.	8.0 ft.-lbs./in. of notch
Heat Distortion—66 psi (ASTM D648)	195° F.

ALL THIS-

Plus High Heat Resistance with Plio-Tuf

HIGH styrene copolymers with unusually high heat resistance and exceptional impact strength are the new and different PLIO-TUF G75C and PLIO-TUF G85C.

These are pure resins—not blends with rubber. They need not be cured to give optimum properties. They are easily compounded. They are easily processed. Conventional equipment can be used to calender, extrude or mold them. Polished or embossed sheets are easily post-formed by vacuum or mechanical drawing.

PLIO-TUF G75C is designed for use alone. PLIO-TUF G85C is made for use with G75C or various rubbers to increase hardness, tensile or heat softening points.

Products made with the PLIO-TUF resins are hard, tough, light, strong and chemically and electrically resistant. They can be sawed, drilled, punched, tapped, turned, sewed—worked like wood or metal. Typical uses include carrying cases, chemical containers, pipe or tubing, automotive and equipment parts, toys, protective helmets and many other molded, post-formed or fabricated items.

JUST FILL THIS OUT FOR FULL INFORMATION AND SAMPLE:

The Goodyear Tire & Rubber Company, Inc.
Chemical Division, Dept. L-9418, Akron 16, Ohio

Please send me full details and sample of the new PLIO-TUF.

☐ I am a fabricator interested in PLIO-TUF sheets.
☐ I am a processor interested in PLIO-TUF resins.

Name_____

Company_____ Position_____

Address_____

CHEMICAL DIVISION GOODYEAR

Chemigum, Pliobond, Pliolite, Plio-Tuf, Pliovic—T. M.'s
The Goodyear Tire & Rubber Company, Akron, Ohio

We think you'll like "THE GREATEST STORY EVER TOLD"—every Sunday—ABC Radio Network—THE GOODYEAR TELEVISION PLAYHOUSE—every other Sunday—NBC TV Network

Use-Proved Products—CHEMIGUM • PLIOBOND • PLIOLITE • PLIO-TUF • PLIOVIC • WING-CHEMICALS—The Finest Chemicals for Industry

Something beautiful

IN WHITE SIDEWALLS

White sidewalls must be whiter and brighter than ever, to match the beauty of the new models in automobiles.

Purest whites at minimum loadings are obtainable with TITANOX titanium dioxide pigments. Some rubber formulators have found a bonus in TITANOX-RA-NC, too; for in their compounds this pigment fortifies rubber against crazing and checking as well as chalking . . . helps tires keep their original whiteness.

Rubber stocks of all kinds can be brightened, whitened or tinted *better* with TITANOX pigments. For help with your pigmentation problem, call on our Technical Service Department. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; Boston 6; Chicago 3; Cleveland 15; Los Angeles 22; Philadelphia 3; Pittsburgh 12; Portland 9, Ore.; San Francisco 7. In Canada: Canadian Titanium Pigments Limited, Montreal 2; Toronto 1.

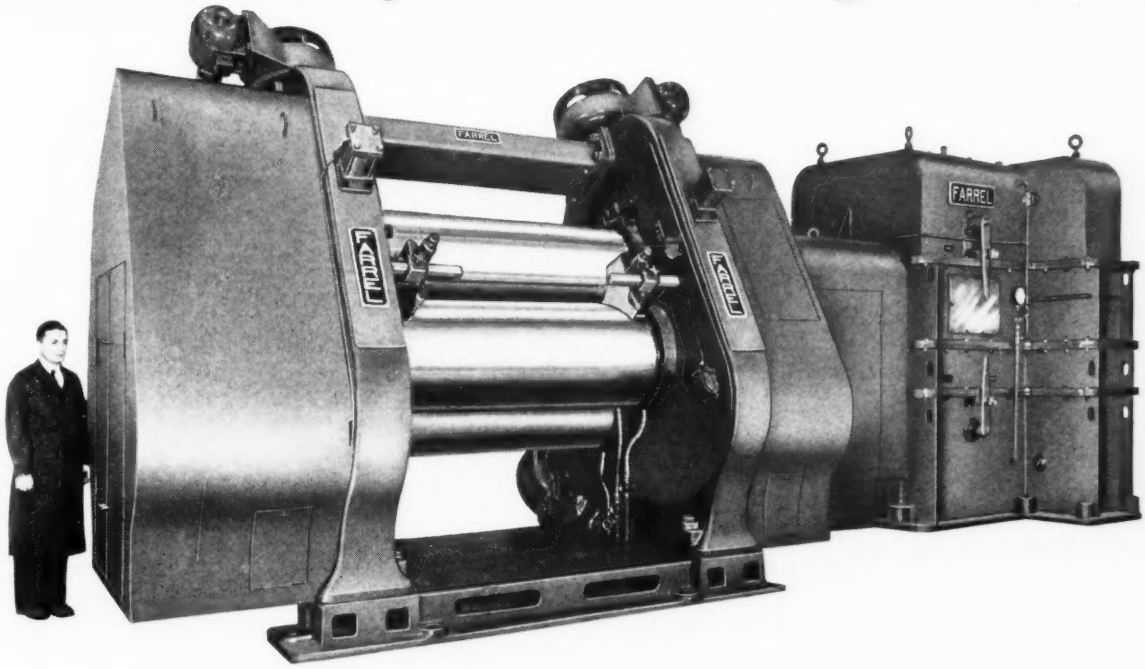
®TITANOX

the brightest name in pigments

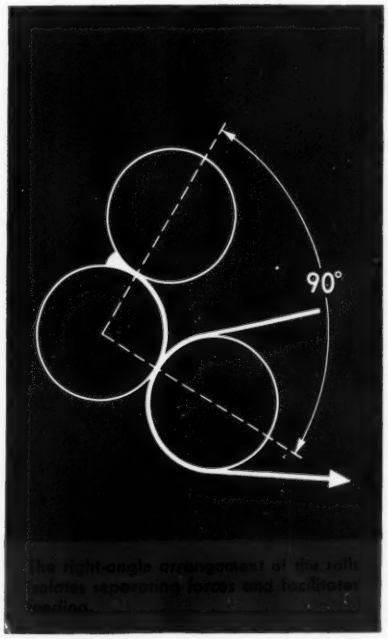
TITANIUM PIGMENT CORPORATION

Subsidiary of NATIONAL LEAD COMPANY

A manufacturer reports:



MATERIAL SAVED AND PRODUCTION DOUBLED WITH NEW FARREL® TRI-ANGULAR CALENDER



The right-angle arrangement of the rolls, plotted separating forces and facilitates feeding.

A famous manufacturer using the new Farrel-Birmingham Tri-angular calender for a coating process, has found it possible to reduce the allowable tolerance to plus or minus 2/10 ounces per square yard. Noted were substantial savings in material due to the machine's extreme accuracy of gauge.

Production speed has been advanced to 80 yards per minute, more than doubling the rate of output attained with previous equipment, while quality is more uniform.

With only two rolls in any plane, because of the right-angle arrangement of the rolls, there is no pressure from a third roll to affect roll settings and cause fluctuations in gauge. This angle of the rolls also makes feeding easier by providing better support to the feed bank. Both the bank and the guides are easily accessible from floor level.

Optional features of this type of calender include rolls drilled longitudinally for close temperature control, a motorized crossed-axes device for regulation of roll crown, and the Farrel Uni-drive.

The Tri-angular calender is the machine of the future—for any type of production requiring two passes. It is available in a choice of sizes. Write for further information.

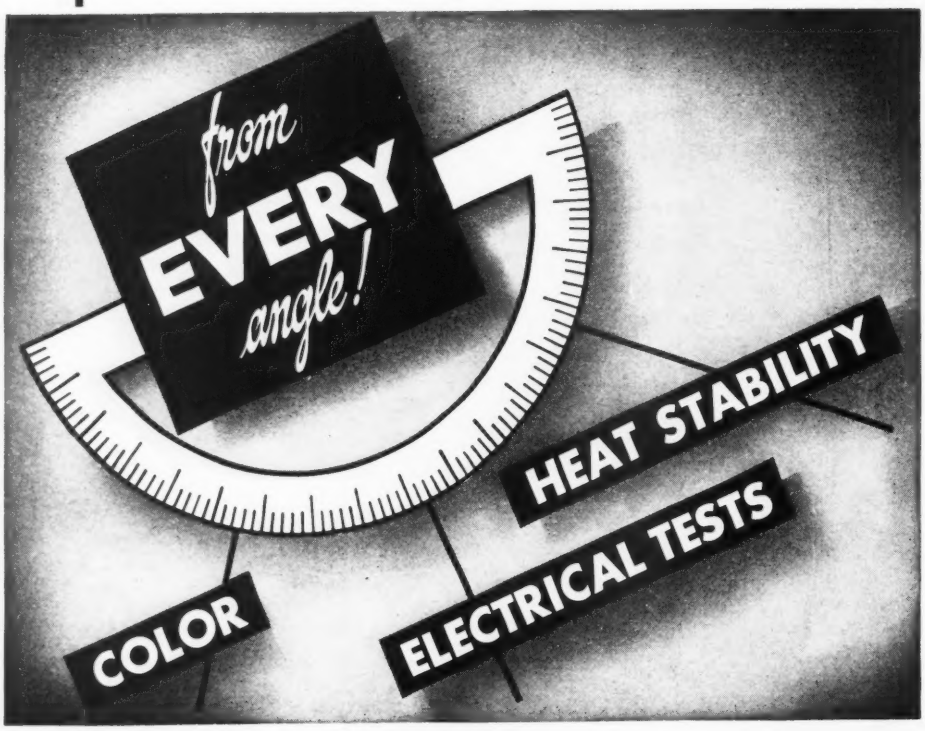
FARREL-BIRMINGHAM COMPANY, INC., ANSONIA, CONN.

Plants: Ansonia and Derby, Conn., Buffalo, N. Y.

Sales Offices: Ansonia, Buffalo, New York, Akron, Chicago, Los Angeles, Houston

Farrel-Birmingham

FB-868



PIGMENT NO. 33

for Compounding

VINYLS AND SYNTHETIC RUBBER

Sample and technical data sent promptly on request

SOUTHERN CLAYS, Inc.

33 RECTOR STREET
NEW YORK 6, N. Y.

NOW...get Flo-Mix by the CARLOAD!

Buffalo's new powdered reclaim is in volume production to meet the demands of industry!

Rubber producers everywhere have been quick to recognize the advantages of the new "reclaim-that-pours" and we have been deluged with orders for large quantities. Until recently, production of "Flo-Mix" has been on a limited basis, but now we've started making shipments by the CARLOAD. Our production schedule will allow us to handle your orders, be they large or small, without delay.

"Flo-Mix", packaged in bags of *uniform* weight, is much easier to handle and is adaptable for automatic weighing and conveying. For these reasons, and because "Flo-Mix" is faster in mixing and blending, substantially *lower costs* are possible. "Flo-Mix" is especially suited for tire treads and sidewalls, molded mechanicals, footwear, soles and heels and industrial belting.

If you have a need for a faster processing, easier handling reclaim, write today for details, test sample and quantity prices on "Flo-Mix, the reclaim-that-pours." Always keep reclaims in your formula and always look to Buffalo for the best. U. S. Rubber Reclaiming Company, Inc., P. O. Box 365, Buffalo 5, N. Y. Trenton agent: H. M. Royal, Inc., 689 Pennington Ave., Trenton, N. J.

70 years serving the industry solely as reclaimers

U.S. RUBBER RECLAIMING COMPANY, INC.

ACTIVATOR NEWS

HORSE HEAD PRODUCTS

A supplement to THE ACTIVATOR—the house organ issued by The New Jersey Zinc Company for over 15 years to aid the Rubber Industry in its use of Zinc Oxide.

UNIQUE COATING
on ZINC OXIDE outwits humidity

Customers tell us that, even in high humidity, switching to PROTOX*-166 ZINC OXIDE provides uniformly fast mixing and excellent dispersion.

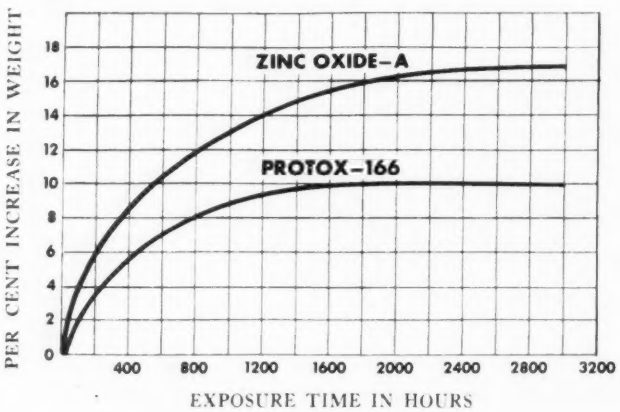
The outstanding humidity resistance of PROTOX-166 stems from the patented coating of zinc propionate that seals the individual particles. Here is how it works:

1. It reduces moisture pickup (see chart).
2. It prevents aggregation that leads to poor dispersion.
3. It is readily wetted by rubber.

*U. S. Patents 2,303,329 and 2,303,330

MOISTURE ABSORPTION OF ZINC OXIDES

under saturated conditions at 77° F.



Protox-166, surface-coated with zinc propionate, picks up less moisture in storage than do untreated types, such as Zinc Oxide-A, and thus processes more uniformly and faster.

TEST PROCEDURE

Three grams of pigment were weighed into wide-mouth (2" dia.) weighing bottles and conditioned for 24 hours over calcium chloride at room temperature. After determining the net weights of the samples, the bottles were stored, unstoppered, over water in a large container held in a constant temperature (77°F.) room. The thin layer of each sample was stirred once daily to assure a uniform condition throughout the oxide, and was weighed periodically to determine the per cent increase in weight.

NOTE: The per cent moisture pickup for zinc oxides in this test is, of course, far more than would occur under industrial storage conditions in multi-walled bags.

THE NEW JERSEY ZINC COMPANY

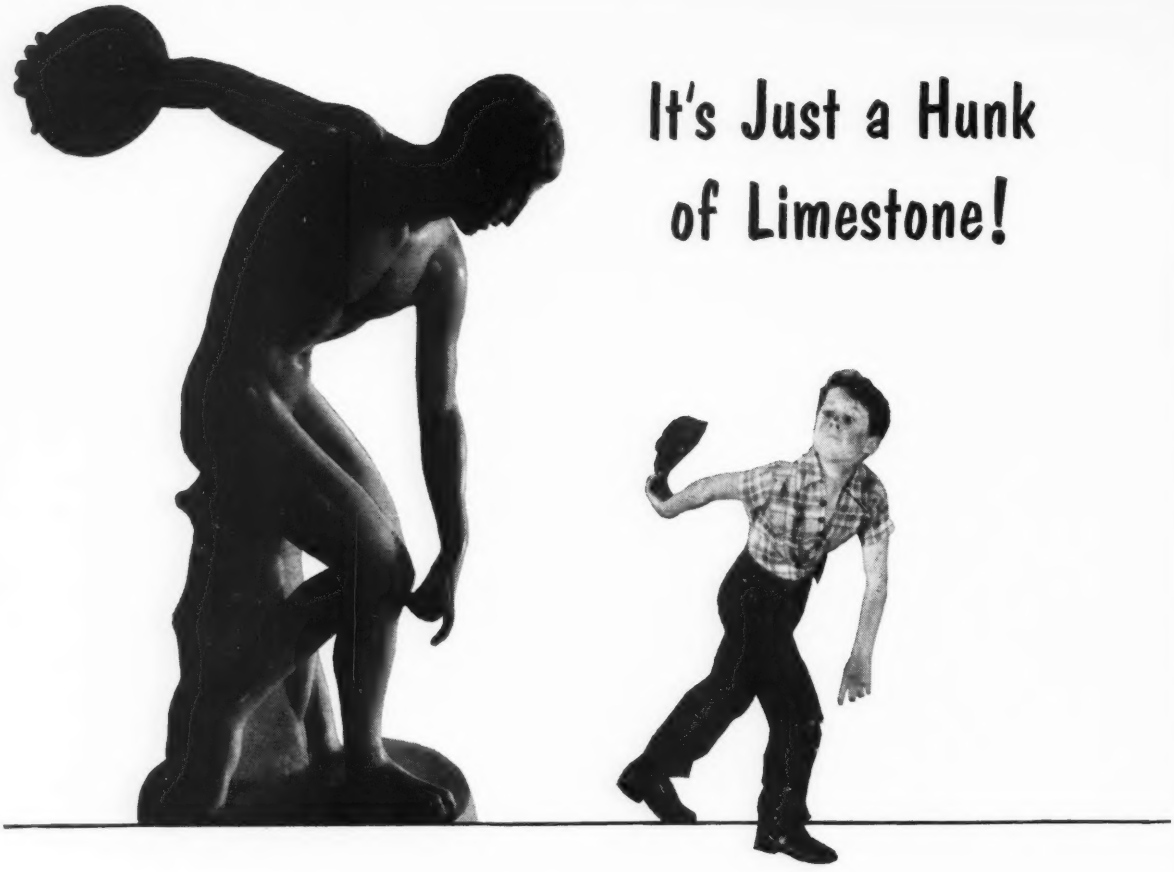
Producers of Horse Head Zinc Pigments

... most used by rubber manufacturers since 1852

160 Front Street, New York 38, N. Y.

HORSE HEAD PRODUCTS

OP
to



It's Just a Hunk of Limestone!

Scientifically, the Discus Thrower is just impure limestone—a piece of calcium carbonate—plus creative thinking. The creative thinking gave it value. Actually far better quality calcium carbonate is precipitated by DIAMOND. It's smoother, finer, more uniform than the finest ground limestone can ever be.

And it is processed in several forms for you to get specific properties in rubber, to help solve your compounding problems.

If you want soft, flexible natural compounds with maximum tear resistance, in either light or dark rubber, specify MULTIFEX® MM. Or there is SUPER MULTIFEX® for greater tear resistance with good tensile strength and low modulus. KALITE® is a semi-reinforcing coated filler recommended for highly loaded soft rubber compounds. MILLICAL® exerts a stiffening effect on green or uncured compounds, prevents sagging when cured in open steam. Recommended as primary filler in rubber floor tile. NON-FER-AL® a non-reinforcing filler for highly loaded compounds where you want low modulus.

This is the merest introduction to our line of precipitated calcium carbonates for rubber and polyvinyl compounds. For literature or specific recommendations for your problems, contact our nearest sales office.

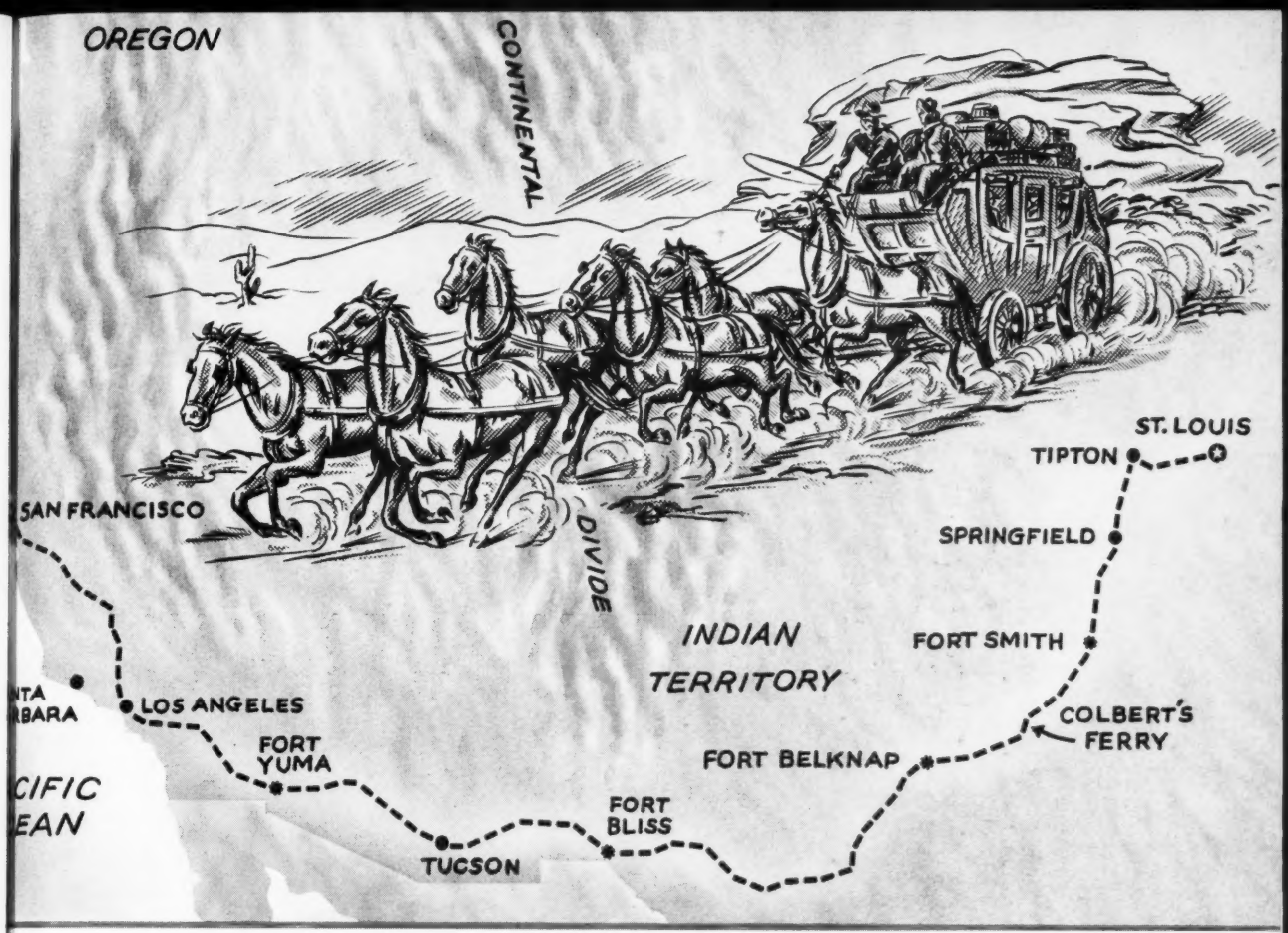
DIAMOND SALES OFFICES: New York, Philadelphia, Pittsburgh, Cleveland, Cincinnati, Chicago, St. Louis, Memphis, Houston.

DIAMOND DISTRIBUTORS: C. L. Duncan Co., San Francisco and Los Angeles; Van Waters and Rogers, Inc., Seattle and Portland, U.S.A.; Harrisons & Crosfield (Canada) LTD.

DIAMOND CHEMICALS FOR THE RUBBER INDUSTRY

DIAMOND ALKALI COMPANY . . . CLEVELAND 14, OHIO

DIAMOND ALKALI CHEMICALS ®



The Butterfield Trail

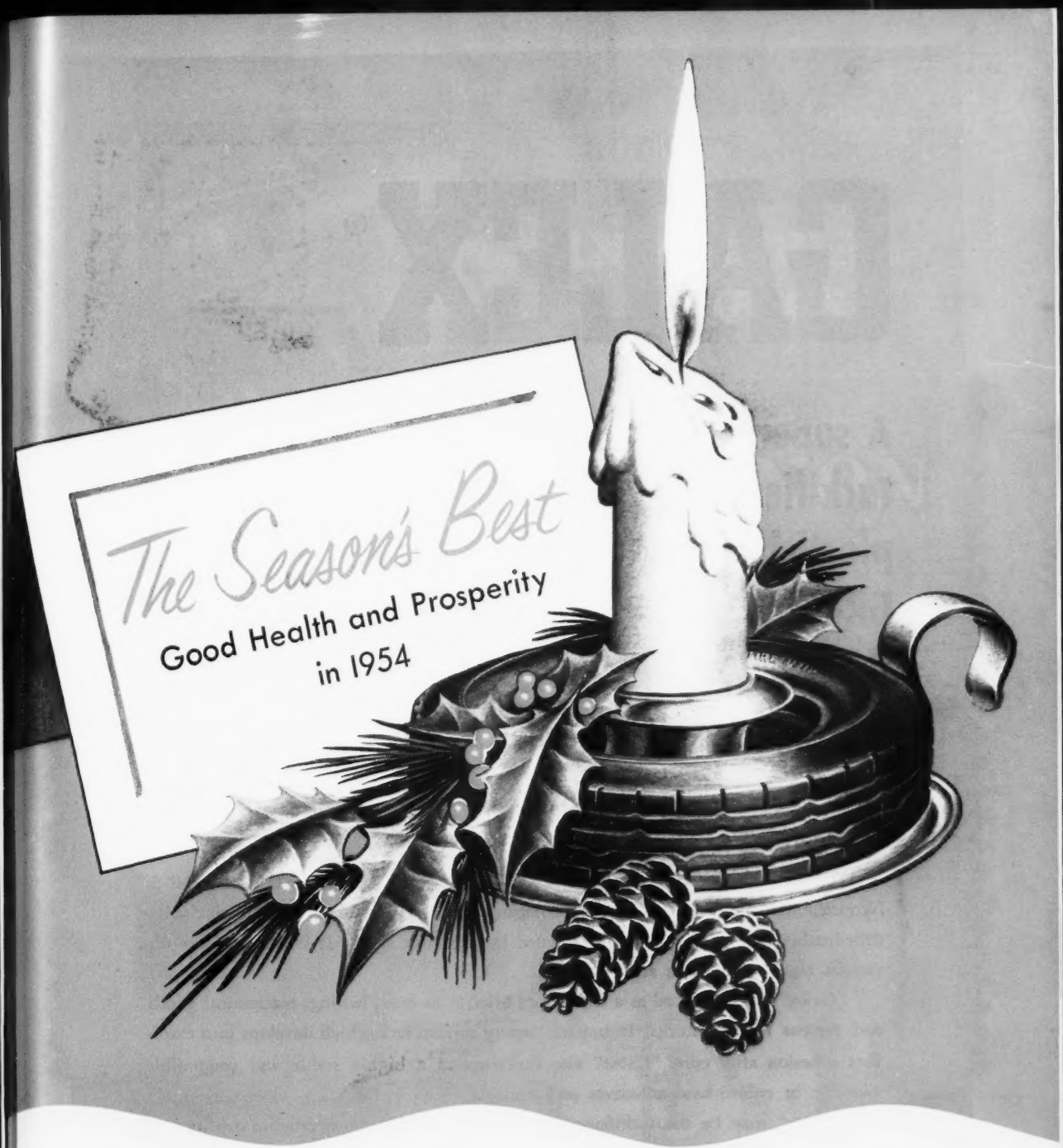
Among the most famous and longest of the freight and trade trails of the early west was the Butterfield Trail, which began operations in 1858 and gave way to the railroad in 1881. The route started from Tipton, Missouri, angled south through Arkansas, across Texas, New Mexico, across Arizona, into California, terminating at San Francisco, a distance of 2800 miles.

The entire trip was scheduled for 25 days, but was later reduced to 23. (The record run was 21 days.) The Butterfield coaches started on a semi-weekly basis, but so great was the traffic that the schedule was shortly changed to six times per week. Passengers paid $150 in gold to travel from San Francisco east, and $200 for the western run. Letters went for 10 cents a half ounce.

Butterfield's Overland Mail, as it was called, furnished the first dependable, well-organized service to the Pacific. There were 160 stations and corrals along the way, wells had to be dug, bridges built, repair shops set up. A personnel of 750 experienced men was needed to serve as agents, drivers, stationkeepers, hostlers and mechanics. The first trip was hailed as another triumph of American enterprise.

Think of riding more than 20 days in a Concord stage coach, over plains, desert and mountains. (Most passengers broke up the trips with stop-overs.) Today, in a fraction of time, the rubber tire transports people and products on a cushion of air with speed and convenience. Vast areas have been opened up, communication speeded, and a nation exchanges the products of its soil and skill within hours, at the most a few days.

Today's rubber tire is another example of American ingenuity and enterprise. Constantly improved, it has brought about increasingly faster communication. Among the important contributors to this ingenuity and enterprise are the makers of United Blacks, whose dependable products help put strength, durability and long-life into the modern passenger and truck tire.



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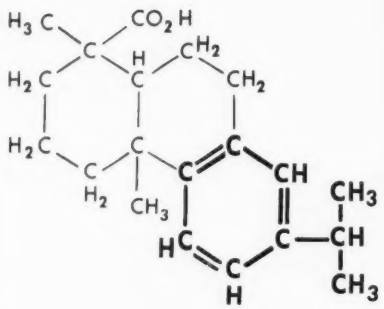
GALEX®

A superior tackifier and plasticizer for GR-S, NEOPRENE, NATURAL RUBBER and RECLAIM



FORMULA

"Galex" is a stable rosin acid that effectively tackifies and plasticizes GR-S, Neoprene, natural rubber and reclaim. Because of its chemical structure, principally dehydroabietic acid, "Galex" is unaffected by oxidative aging. It is compatible with various elastomers, resins and solvents.

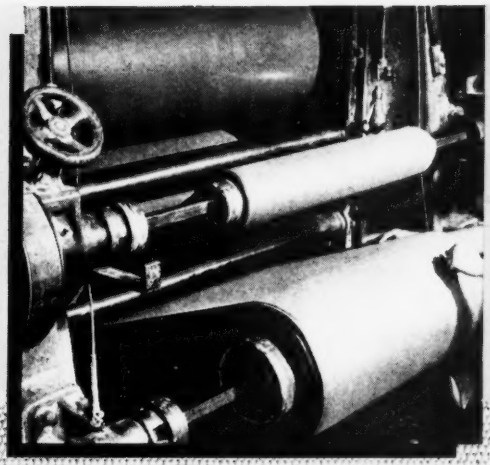
"Galex" is widely used as a tackifier-plasticizer in hose, belting, mechanical goods and various friction stocks. It imparts strong surface tack which develops into excellent adhesion after cure. "Galex" also functions as a highly stable and compatible tackifier in rubber-base adhesives and cements.

"Galex" may be the tackifier-plasticizer you need to build maximum quality into *your* compound. Its superior tack, excellent aging resistance and high compatibility warrant your investigation. Write for technical information and samples.

Thiokol® Chemical Corporation

784 NORTH CLINTON AVENUE • TRENTON 7, NEW JERSEY

In Canada: Naugatuck Chemicals Division, Dominion Rubber Company, Elmira, Ontario



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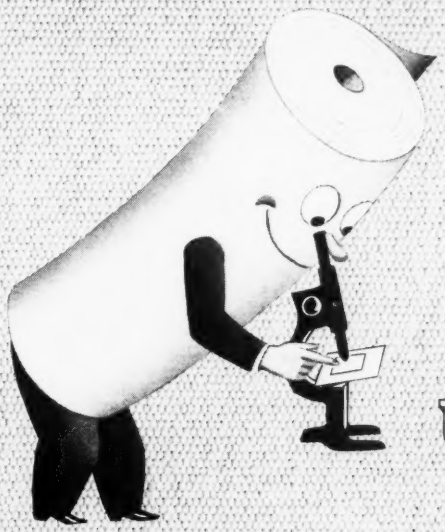
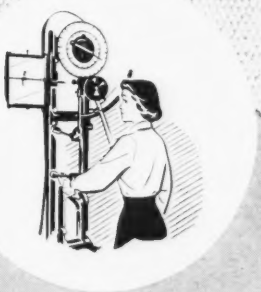
Makes The Big Difference In
INDUSTRIAL FABRICS

MT. VERNON FABRICS



GIVE YOU GREATER UNIFORMITY



Determining Yarn Tensile Strength with 300-lb. vertical test. One of a series of comprehensive laboratory controls throughout production to assure uniformity in all Mt. Vernon-Woodberry products.

FABRICS ENGINEERED TO FIT YOUR NEEDS

Need adaptation of an existing fabric to your special purposes? Or creation of an entirely NEW fabric — cotton, synthetic or blend — to meet your specifications? Mt. Vernon-Woodberry's staff of textile engineers is available on request to help you with your problems in development or application of industrial fabrics.

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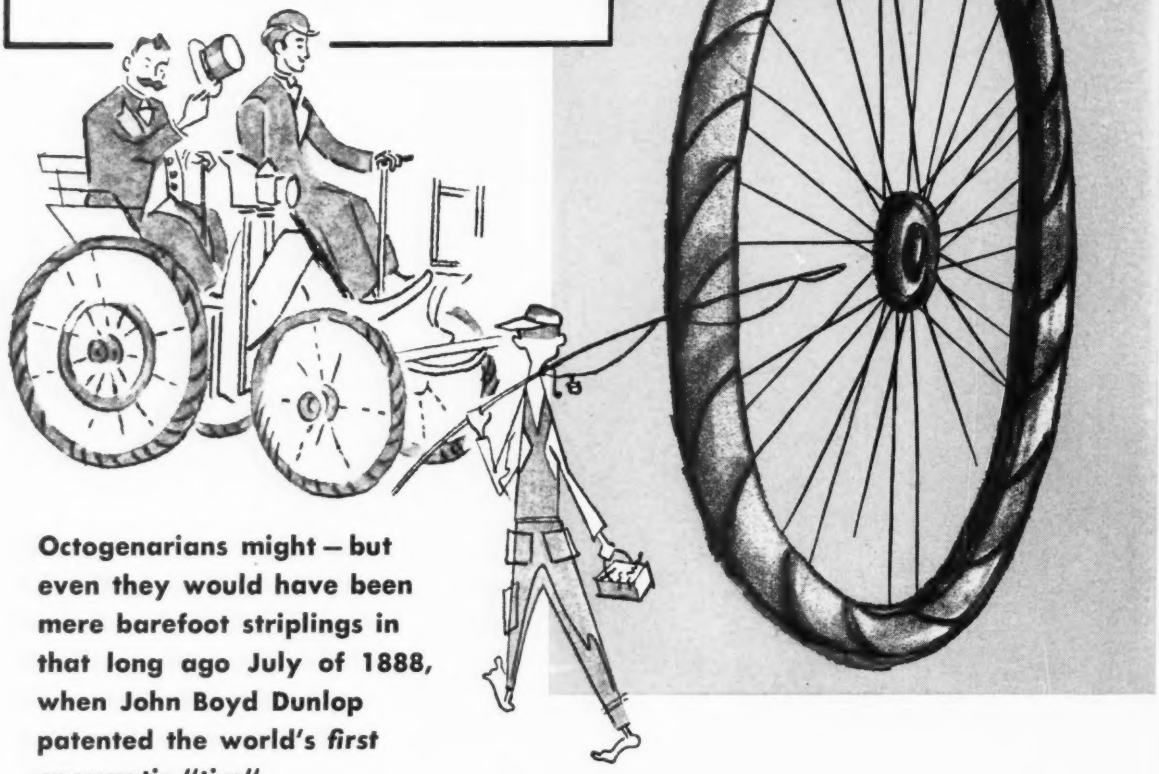
REMEMBER THIS TREAD?



Octogenarians might – but even they would have been mere barefoot striplings in that long ago July of 1888, when John Boyd Dunlop patented the world's *first* pneumatic "tire"

THERE really wasn't much tread to remember . . . just a few edges where the crude "wrappings" overlapped. But their dim imprint in the dusty roads of those bygone days, heralded the marvelous tires that make our motor vehicles "airborne" today. Indeed, our dramatic age of motor transport, and the great tire industry that makes it possible, *both* owe their very existence to the first Dunlop "Pneumatic Tire."

At Bridgwater, we're well acquainted with most of the history of pneumatic tire development. As manufacturers of automotive tire molds, we've worked closely with the industry for nearly half a century, *helping* it develop . . . helping it meet steadily growing demands for tires by furnishing molds and equipment of higher quality and greater *workability*. In fact, the splendid Dunlops of today —and most of the nation's other best-known tires— come from molds built by Bridgwater.

Today, in Athens, Ohio, Bridgwater's Athens Machine Division meets the mold requirements of the tire industry on a greater scale than ever . . . with a larger plant, and a larger complement of technicians and long-experienced metal-working craftsmen. These skilled artisans and their specialized machines—many of our own design—produce finer quality molds of every type or size, in engraved steel, cast iron or aluminum.

Here, with mold-making the *exclusive* occupation of both men and machines, Bridgwater builds finer molds for the tire industry, faster, and at more favorable cost.

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THE BRIDGWATER MACHINE COMPANY

Akron, Ohio

1783

RELIABLE ZINC OXIDES

AZO-ZZZ-44 and AZO-ZZZ-55 assure good dispersion and easy processing because of their uniform particle size and absence of extreme fines. With AZO-ZZZ-11, 22, 33, (Acicular types) and special grades, a complete range of zinc oxides is offered for every rubber requirement.

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American Zinc assures an uninterrupted supply of zinc oxide. Recent discovery and development of a new, large ore body, added to previous American Zinc reserves, provides sufficient ore to last many years at the current rate of production.

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ZZZ-55

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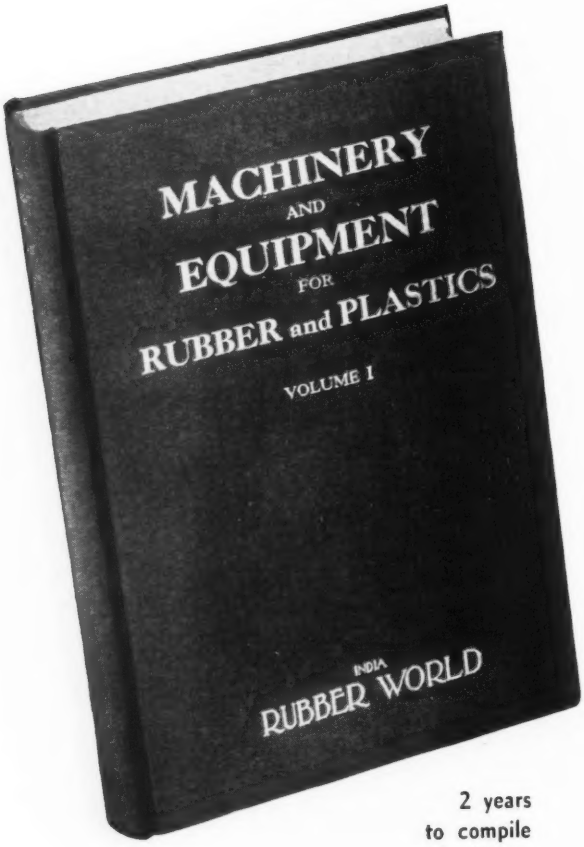
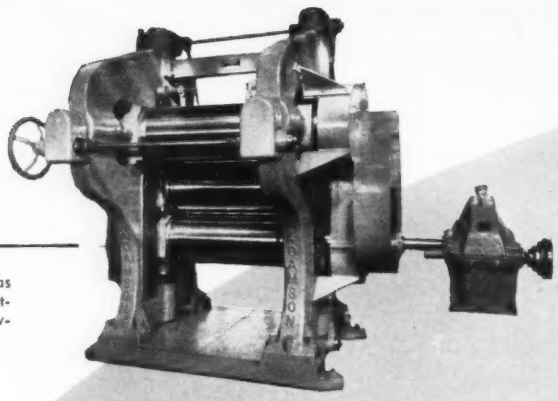


2 years
to compile
and edit —

This time and money-saving book was compiled by Robert G. Seaman and Arthur M. Merrill, editors of India RUBBER WORLD, a publication with a background of 64 years of close contact with the men who have invented, improved, built, sold and used rubber machinery and equipment since 1889.

The urgent need and value of this 804 page book will be self-evident to all engineering, processing, purchasing and management personnel, especially to those men who have been confronted in the past with the problem of gathering this frequently needed and vital information from varied and widely-scattered sources.

Hundreds of orders have already been received from individuals, firms, libraries and schools — in U.S.A. and abroad. The edition being very limited prompt action is suggested. No reprint is anticipated.



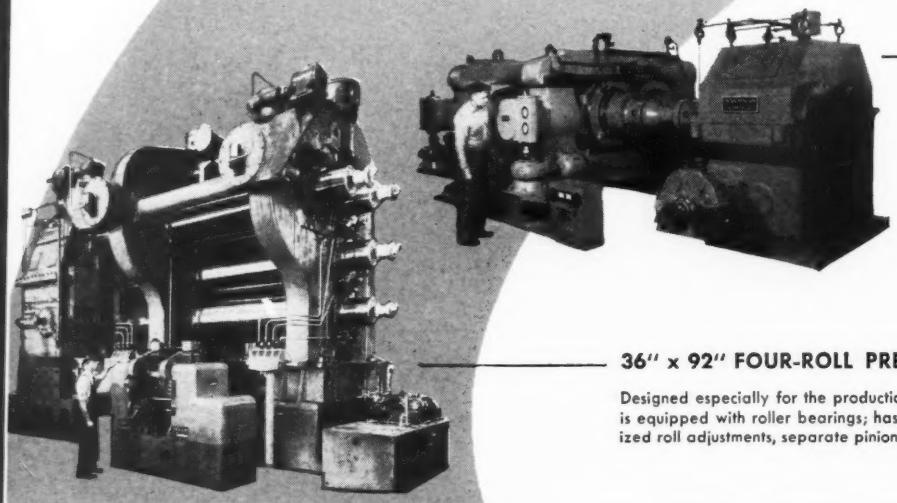
16" x 36" FOUR-ROLL CALENDER

For rubber and sponge products. Has sleeve bearings, herringbone connecting gears, manually operated screw-downs, and grease lubrication.

20" x 54" THREE-ROLL CALENDER

For medium speed production of various types of rubber products. Equipped with herringbone even speed and friction gearing, sleeve bearings, grease lubrication, and motorized roll adjustments. Drive can be adapted to suit available space.

ADAMSON UNITED CALENDERS

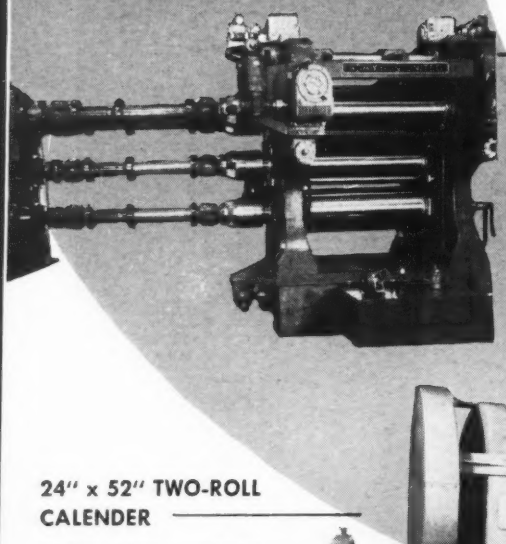


30" x 54" TWO-ROLL HORIZONTAL CALENDER

For finishing asphalt floor tile. This machine is equipped with roller bearings, drilled rolls, pinion stand drive with universal couplings, motorized roll adjustments, and adjustable speed control for tandem operation.

36" x 92" FOUR-ROLL PRECISION CALENDER

Designed especially for the production of thin plastics film up to 72" wide. This unit al is equipped with roller bearings; has roll crossing and zero clearance equipment, moto ized roll adjustments, separate pinion stand with universal couplings and flood lubricatio

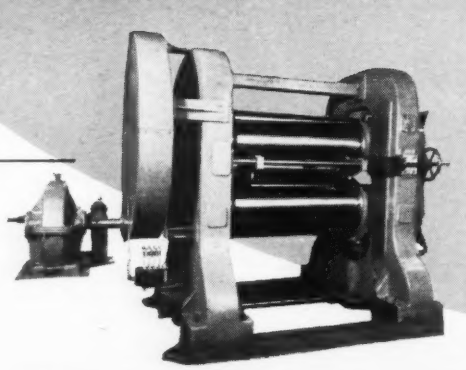


24" x 68" FOUR-ROLL DELUXE PLASTICS CALENDER

Produces 57" wide film at high speeds. Has roller bearings, zero clearance equipment, roll crossing device, roller bearing universal couplings, drilled rolls, motorized stock guides and flood lubrication. Drive is through a separate pinion stand which has its own complete flood lubrication system.

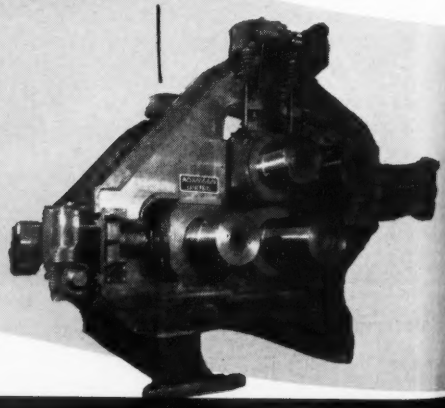
24" x 68" FOUR-ROLL Z-TYPE RUBBER CALENDER

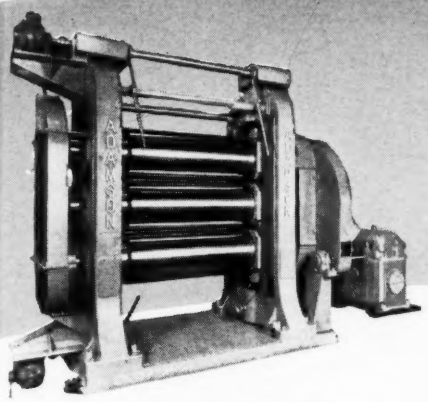
For high speed double-coating of tire fabric. Has sleeve bearings with grease or flood lubrication, motorized roll adjustments, herringbone connecting and drive gears, plus other features required for high speed production.



24" x 52" TWO-ROLL CALENDER

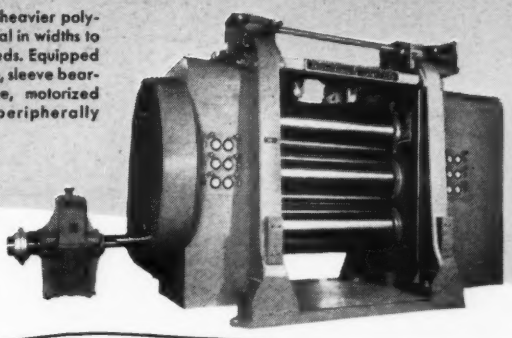
Another Adamson calender, vertical type, used in the production of floor tiling.





24" x 68" FOUR-ROLL STANDARD PLASTICS CALENDER

Produces 2 mil and heavier polyvinyl chloride material in widths to 57" at medium speeds. Equipped with flood lubrication, sleeve bearings, zero clearance, motorized roll adjustments, peripherally drilled rolls.



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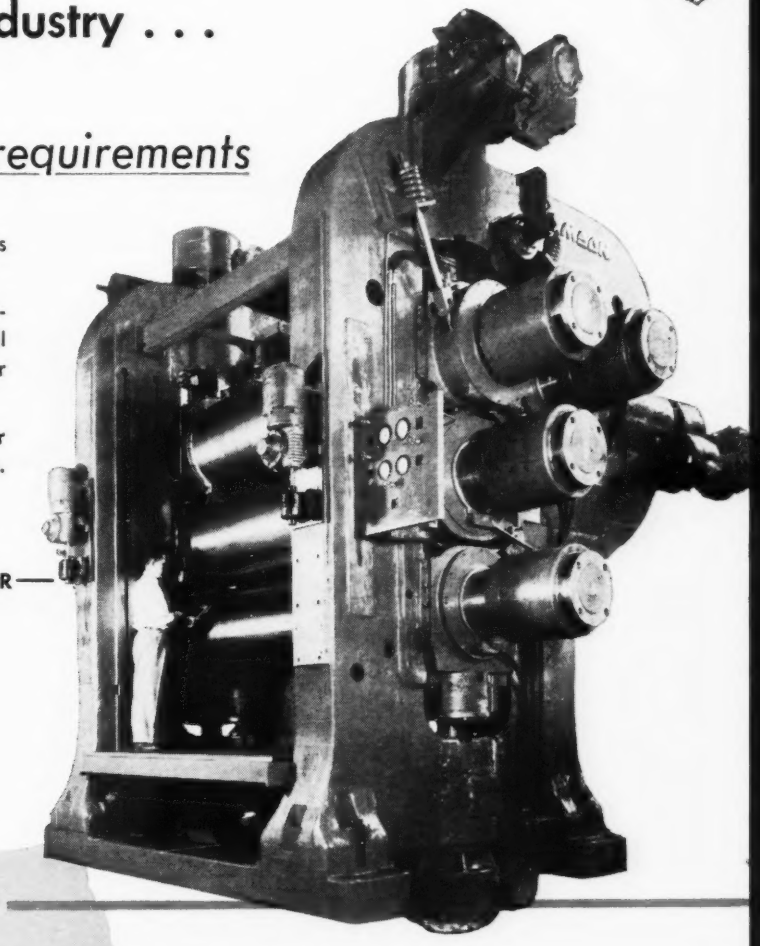
designed for the industry . . .

Engineered to your special requirements

Shown are some of the many types of calenders made to order for our customers.

Given product specifications and required maximum speed, we will design, build and install all basic and auxiliary equipment required for your complete manufacturing process.

We invite your inquiry concerning calendering or any other rubber or plastics processing problem.



32" x 92" FOUR-ROLL PRECISION CALENDER

This unit is geared to produce 72" wide vinyl film, 2 mils and less in thickness, at production speeds up to 150 YPM. It is equipped with anti-friction bearings, zero clearance, motor operated stock guides, motor operated roll crossing device, flood lubrication, universal couplings, pinion gear stand, drilled rolls and automatic temperature control. The electrical drive includes separate DC motors for each component, with speed trimming devices. Auxiliaries consist of embossing equipment, cooling unit and automatic turret-type windup.

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ST. JOE Unit-Loads

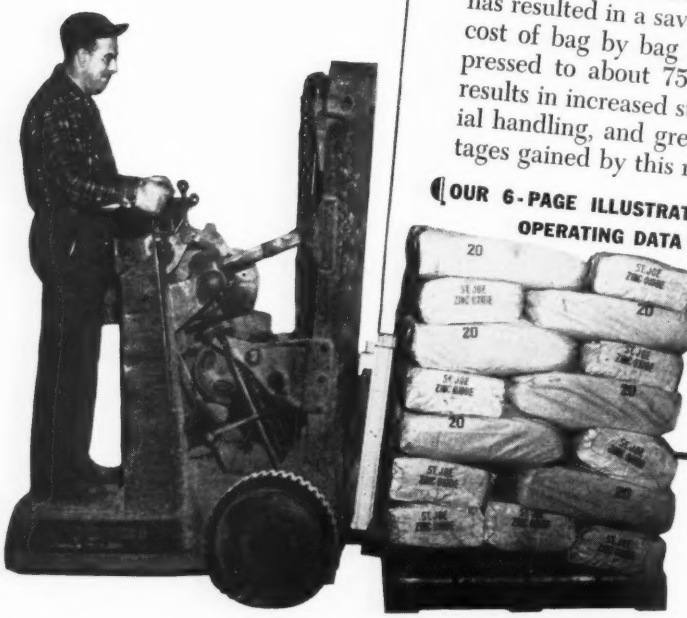
FOR TRUCK & CARLOAD SHIPMENTS OF

ZINC OXIDE

NOW AVAILABLE AT NO ADDITIONAL COST

THE ST. JOSEPH LEAD COMPANY after several years of experimenting, has developed for its zinc oxide customers a loading method known to the trade as "unit load." This new method has been worked out successfully for both truck and carload shipments with a number of zinc oxide users who have adopted it as a standard practice for their shipments. This service is provided at no additional cost to the customer, and has resulted in a saving of up to 50% of the unloading cost of bag by bag handling. Each unit-load is compressed to about 75% of its original volume, which results in increased storage capacity. Improved material handling, and greater cleanliness are other advantages gained by this method.

OUR 6-PAGE ILLUSTRATED FOLDER, CONTAINING DETAILED OPERATING DATA ON THE ST. JOE UNIT-LOAD METHOD IS YOURS FOR THE ASKING.



ST. JOSEPH LEAD COMPANY
250 Park Avenue, New York 17

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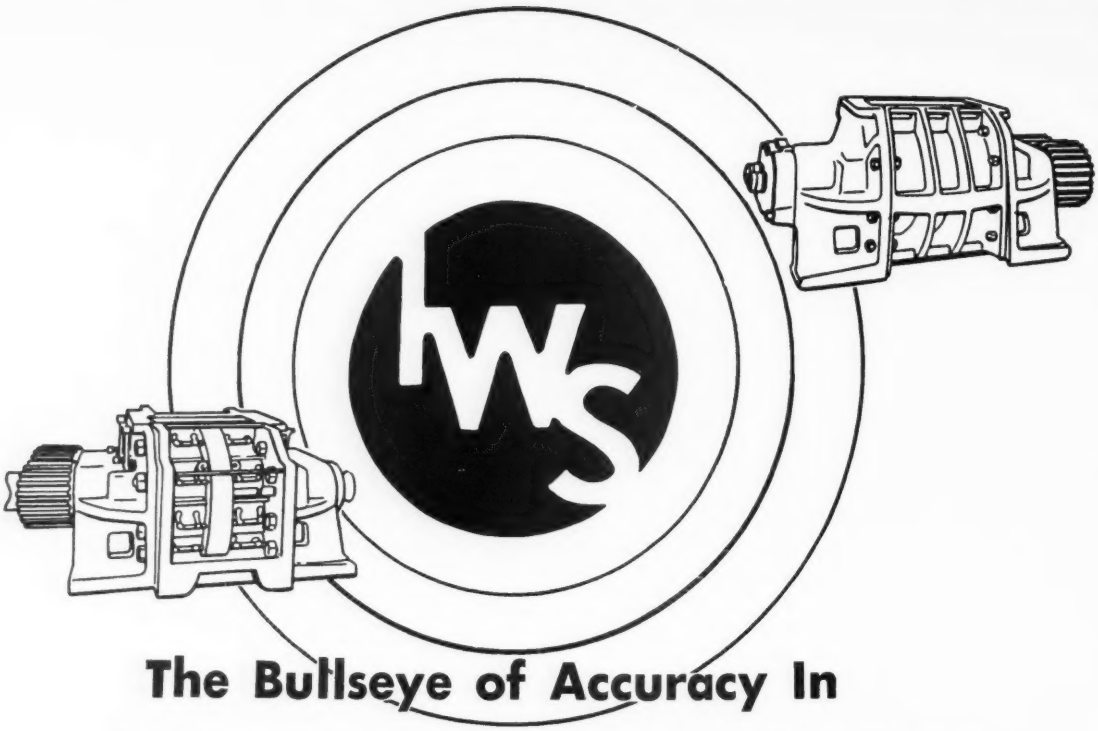

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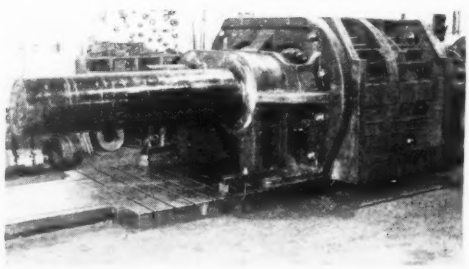
WHEN your Banbury Mixer needs repairing or rebuilding, give us a call.

Interstate Rebuilding Service assures you the right answer to two chief concerns; 1—That every worn part will be restored to correct dimensions and contour or replaced new. 2—That the work be expedited to hold your "down time" to the minimum.

Our nine-step method of rebuilding and hard surfacing your Banbury body has been perfected through years of exclusive specialization rapidly approaching the one-score mark. An Interstate-rebuilt Banbury body has that "good as new" efficiency you seek.

Interstate facilities handle every size of Banbury. It will cost you nothing to have an estimate. One of our engineers will visit your plant and inspect your installation at your request.

We also have spare parts for all mixer sizes. Shown at right is a No. 27 Body rebuilt by Interstate, reassembled and mounted on bed plate in our plant ready for customer to see it running.



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Experience, a necessary ingredient in the manufacture of any product, is especially essential in roll making where only by long and intimate association with an industry, can its requirements be thoroughly understood and successfully provided for.

To United's 50 years of roll making experience can be added the advantages of its continuing program of metallurgical research, basically sound engineering and modern production facilities—a combination that made, and has kept, United Rolls favorites in outstanding processing plants throughout the world.

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When in need of rolls—for whatever requirement—consult us.

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Subsidiaries: Adamson United Company, Akron, Ohio; Lobdell United Company, Wilmington, Delaware; Stedman Foundry and Machine Co., Inc., Aurora, Ind.

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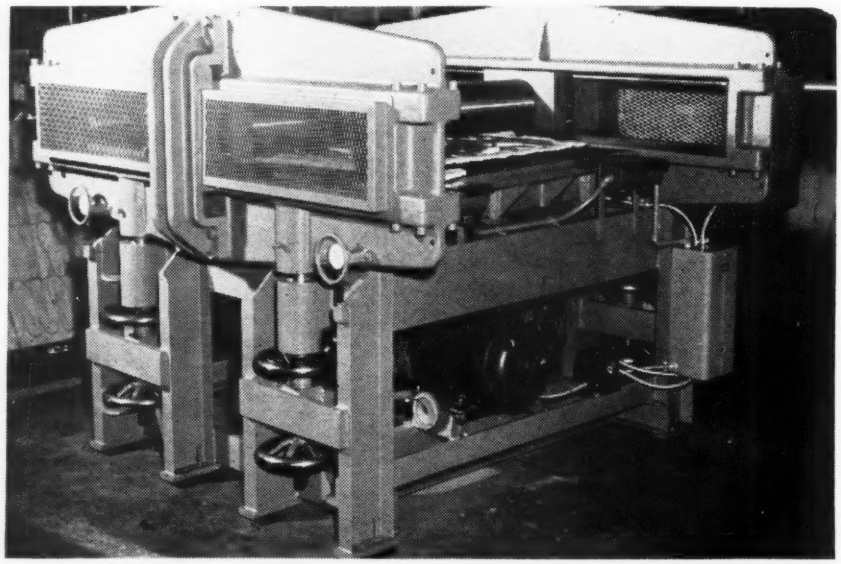

This Is Our **Heavy Duty** Roller Die Cutter— Built to Easily Cut **Tough** Materials!

PRESS a button and the Campbell Heavy Duty Power Roller Die Cutter starts to save your time and make you money. The large bed (up to 24 square feet) enables you to make multiple cuts in one operation using inexpensive dies! This machine easily die cuts foam rubber, sponge, rubberized hair, felt, cotton, etc., then wades right through such *tough* stuff as cloth, rubber impregnated cloth, and even flat molded rubber stocks of certain thickness and hardness. *Here's our offer to you*—send us your tough-to-cut materials, we'll make trial cuts on this machine and report to you. No obligation—we're glad to prove what this machine will do to make your operation more profitable for you!

Send This Coupon

Falls Engineering & Machine Co.,
Cuyahoga Falls, Ohio

Please send: ☐ Information on Campbell Power Roller Die Cutter; ☐ Folder and prices on Campbell Soapstone Dispenser; ☐ Campbell V-Belt Equipment

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HAPPY NEW YEAR!
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Use the **UNSEEN SALES POINT**
in building rubber sales

A CLEAN, NEUTRAL ODOR . . .

When a foam-rubber pillow has a clean, *neutral* odor, it helps the salesman to draw attention to the many *visible* advantages of rubber products. More and more rubber-goods manufacturers are building their sales by treating their products with Du Pont "Alamask" odor-masking compounds.

In this way, they are capitalizing on the "unseen sales point" of a neutral odor . . . and they are doing it at an almost negligible cost. Only a small quantity of "Alamask" is required in each batch, and no special equipment is necessary in applying it.

Like these manufacturers, you, too, will find that durable "Alamask" compounds offer many processing advantages. They will not break down in aeration, curing, or banburying systems, or at high temperatures. The effect of the "Alamask" will last until the unpleasant odors, caused by blowing agents and processing materials, have disappeared in use. "Alamask" will make your rubber products easier to sell.

There is an "Alamask" odor-masking compound designed to suit your needs. For more information—or for technical-service helps on any "Alamask" application—write E. I. du Pont de Nemours & Co. (Inc.), Aromatics Section, Wilmington 98, Delaware.

Du Pont **Alamask** Odor-Masking Compounds

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. . . THROUGH CHEMISTRY

a key executive?

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a skilled worker?

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Lost Needlessly?

Although more than 70,000 Americans were cured of cancer last year the tragic truth is that at least 70,000 others—who might have been saved—lost their lives because their cancers had spread and "colonized" in other parts of their bodies before proper treatment could be started.

That's why we want everyone to realize that, since most early cancers can be cured, the best "insurance" is:

FIRST . . . *To have a thorough health check-up every year no matter how well you may feel (twice a year for women over 35).*

SECOND . . . *To learn the 7 danger signals that may mean cancer, and go straight to your doctor at the first sign of any one of them—(1) Any sore that does not heal (2) A lump or thickening, in the breast or elsewhere (3) Unusual bleeding or discharge (4) Any change in a wart or mole (5) Persistent indigestion or difficulty in swallowing (6) Persistent hoarseness or cough (7) Any change in normal bowel habits.*

If you want us to arrange a special educational program for your fellow-workers, phone the American Cancer Society office nearest you or address your letter to "Cancer" in care of your local Post Office.

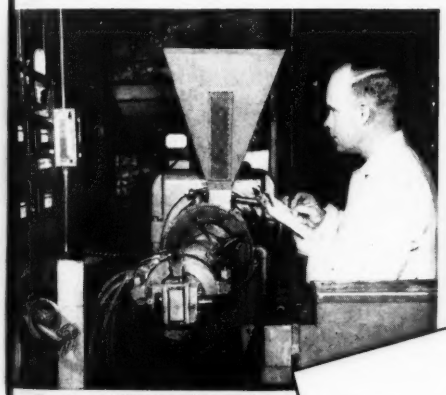
American Cancer Society

Cabflex Di-OP

FOR WIRE INSULATION COMPOUNDS

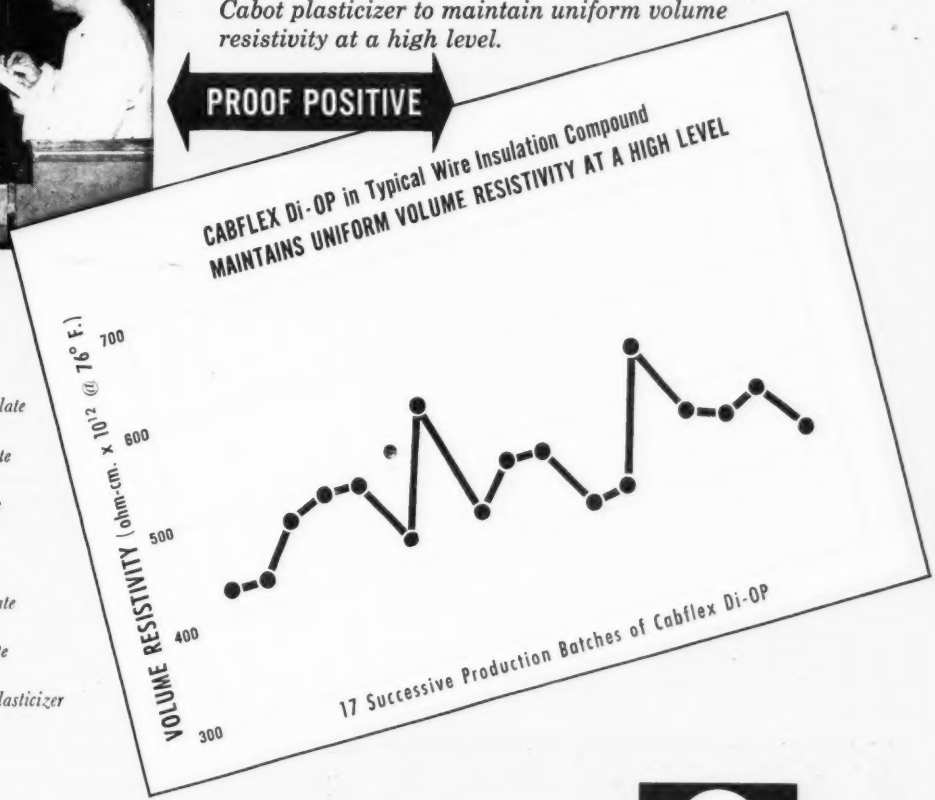
Tested and proved in laboratory and in plant, Cabflex Di-OP imparts consistently uniform, highest quality electrical properties to vinyl wire and cable compounds.

The results of laboratory evaluation of 17 successive production batches of Cabflex Di-OP in a typical wire insulation compound prove beyond doubt the ability of this Cabot plasticizer to maintain uniform volume resistivity at a high level.



Courtesy of The Rex Corporation, West Acton, Mass.

PROOF POSITIVE



Cabflex Di-OP
di-iso-octyl phthalate
Cabflex Di-OA
di-iso-octyl adipate
Cabflex DDP
di-decyl phthalate
Cabflex DDA
di-decyl adipate
Cabflex Di-BA
di-iso-butyl adipate
Cabflex Di-OZ
di-iso-octyl azelate
Cabol 100
hydrocarbon oil plasticizer

Plasticizer Division **GODFREY L. CABOT, INC.**
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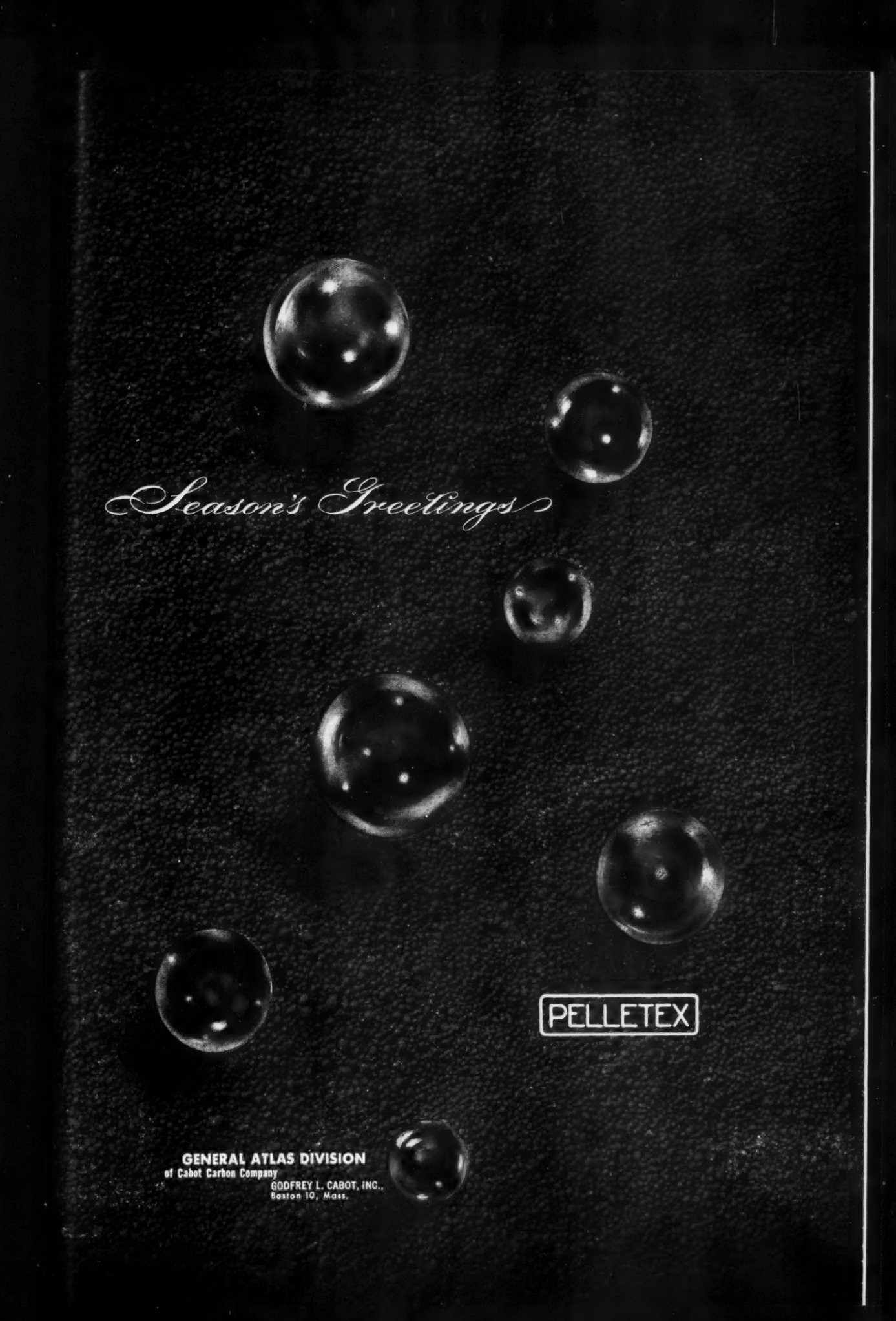
Season's Greetings
PELLETEX
GENERAL ATLAS DIVISION
of Cabot Carbon Company
GODFREY L. CABOT, INC.,
Boston 10, Mass.

KNIT your profits

—at high speeds . . .

. . . with Fidelity's method of HOSE reinforcement

You can knit natural and synthetic yarns at speeds up to 1,000 feet per hour on rubber and plastic extrusions in continuous lengths. Hose is strong and *flexible*, adhesion is better, diameters are uniform.

By eliminating costly rewinding, treating and drying operations, electrically controlled Fidelity Hose Reinforcement Machines are setting new economy records in plants where they replace conventional braiders. These machines have been time tested by the world's leading Rubber Hose Manufacturers for nearly 20 years.

Write today for Catalog HR describing advantages and technical details. When in the Philadelphia area, visit the new showroom at our plant and see the Fidelity Hose Reinforcement Machine in operation.

Designers and Builders of Intricate, Automatic Precision Machines

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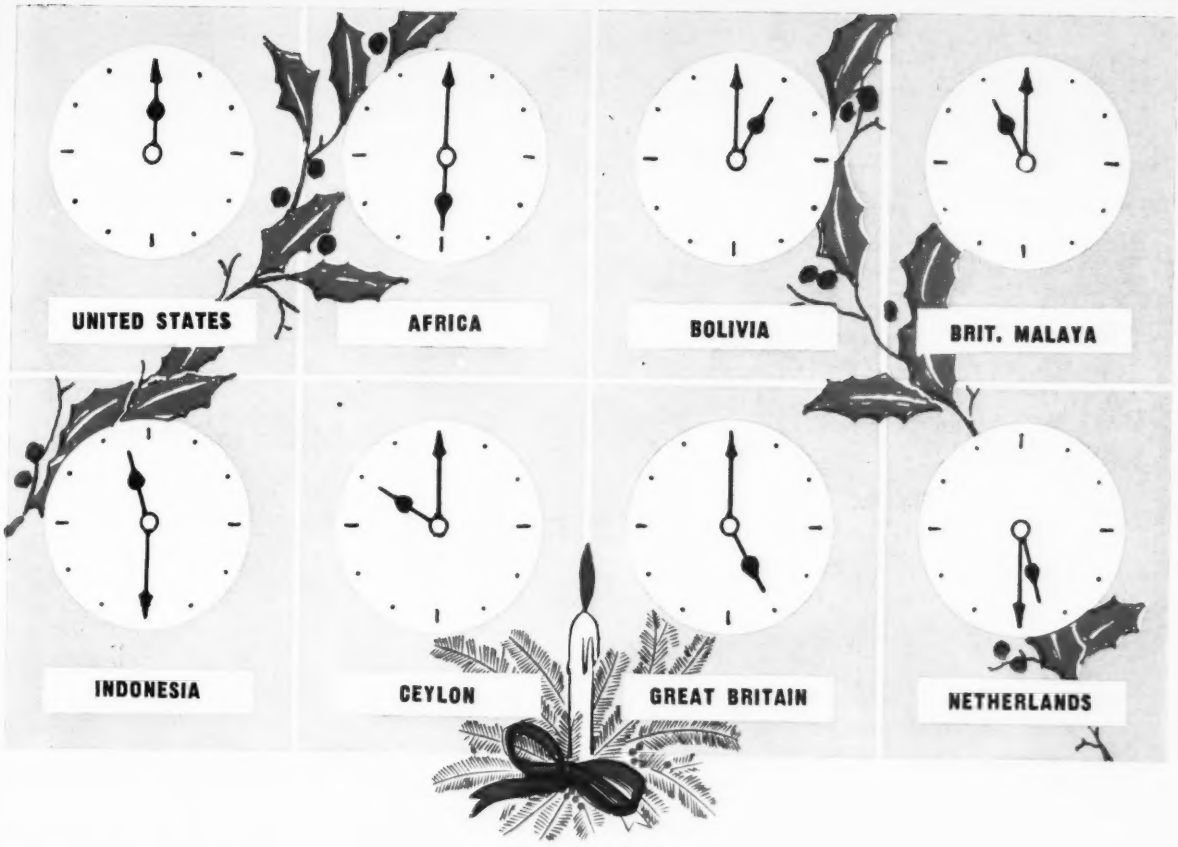

Season's Greetings

S. J. PIKE & CO., INC.

CABLE ADDRESS "PIKESID, N.Y."

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Reprinted from an Official Advertisement Published on November 18, 1953

Rubber Producing Facilities Disposal Commission

Invitations for Proposals

Pursuant to the Rubber Producing Facilities Disposal Act of 1953 (P.L. 205, 83d Congress, 1st Session, approved August 7, 1953) the Rubber Producing Facilities Disposal Commission announces that it will receive written proposals for the purchase (or, in certain instances indicated below, the lease) of the properties and facilities described below, hereafter collectively referred to as "the rubber-producing facilities". Such proposals may be submitted at any time beginning November 25, 1953 through May 27, 1954, (unless extended by the Commission upon adequate notice) at the Office of the Commission, 811 Vermont Avenue, Washington 25, D. C. Detailed information concerning the form of proposals and the manner in which they are to be submitted may be obtained from the Secretary of the Commission upon request.

FACILITIES: The facilities offered for sale consist of 13 plants for the manufacture of butadiene-styrene type rubber (GR-S), 2 plants for the manufacture of butyl rubber (GR-I), 1 plant for the manufacture of styrene, 8 plants for the manufacture of butadiene, 1 plant for the manufacture of dodecyl mercaptan, a fleet of 448 pressure tank cars (ICC Classification—ICC-104AW) and miscellaneous items of equipment.

The plants which are in operating condition and which are offered for sale as complete operating units are set forth in the following table.

These plants are operated for the account of the Reconstruction Finance Corporation as units in an integrated synthetic rubber industry. The 13 GR-S plants and the 2 GR-I plants are practically the exclusive domestic sources of these types of rubber. All of the butadiene consumed in the domestic manufacture of synthetic rubber is produced in the butadiene plants offered for sale or lease. The styrene plant produces a significant portion of the total requirements of the synthetic rubber program, the remainder being purchased from commercial sources. Dodecyl mercaptan is an ingredient of one type of GR-S, and the plant offered for sale produces the program's requirements for this chemical.

Detailed descriptive brochures relating to each of the plants may be obtained upon application to the Secretary of the Commission. Similarly, descriptive inventory of the miscellaneous facilities hereby offered for sale will be available.

Plancor No.	*Present Operator*	*Location*	*Maximum Annual Capacity*
BUTADIENE-STYRENE RUBBER (GR-S) PLANTS			
876	Copolymer Corp.	Baton Rouge, La.	49,000 LT
127	Firestone Tire & Rubber Co.	Akron, Ohio	30,000 LT
1056	Firestone Tire & Rubber Co.	Lake Charles, La.	99,600 LT
877	General Tire & Rubber Co.	Baytown, Texas	44,000 LT
983	B. F. Goodrich Co.	Port Neches, Texas	90,000 LT
980	B. F. Goodrich Co.	Institute, W. Va.	122,000 LT†
126	Goodyear Synthetic Rubber Corp.	Akron, Ohio	15,200 LT
956	Goodyear Synthetic Rubber Corp.	Houston, Texas	99,600 LT
1278	Kentucky Synthetic Rubber Corp.	Louisville, Ky.	44,000 LT
611	Midland Rubber Co.	Los Angeles, Calif.	89,000 LT
982	Phillips Chemical Co.	Borger, Texas	66,000 LT
129	U. S. Rubber Co.	Naugatuck, Conn.	22,200 LT
983A	U. S. Rubber Co.	Port Neches, Texas	89,400 LT
BUTYL RUBBER (GR-I) PLANTS			
1082	Humble Oil & Refining Co.	Baytown, Texas	43,000 LT
572	Esso Standard Oil Co.	Baton Rouge, La.	47,000 LT
BUTADIENE PLANTS—PETROLEUM			
706	Cities Service Refining Corp.	Lake Charles, La.	60,000 ST
152	Copolymer Corp.	Baton Rouge, La.	23,000 ST
485	Humble Oil & Refining Co.	Baytown, Texas	49,000 ST
933	Neches Butane Products Co.	Port Neches, Texas	197,000 ST
484	Phillips Chemical Co.	Borger, Texas	71,200 ST
1063	Sinclair Rubber, Inc.	Houston, Texas	78,000 ST
963	Shell Chemical Corp.	Los Angeles, Calif.	61,000 ST‡
1593	Standard Oil Co. of California	El Segundo, Calif.*	
STYRENE PLANT			
929	Dow Chemical Co.	Los Angeles, Calif.	57,000 ST
OTHER FACILITIES			
543	U. S. Rubber Co.	Naugatuck, Conn.	

† This facility is now in stand-by.

‡ Represent a tandem operation whereby Standard Oil Co. of California's production of crude butadiene is transferred to Shell Chemical Corp. for purification along with Shell's crude production.

* This facility is erected upon land held under an assignable lease which expires on February 15, 1958, from Standard Oil Company of California; all other plants are erected on property owned in fee by the government.

In addition to the foregoing, there are offered for sale, or alternatively for lease, 2 plants for the manufacture of butadiene from alcohol, located respectively at Louisville, Kentucky, and Kobuta, Pennsylvania. The plant at Louisville, Kentucky, Plancor 1207, has been operated, and is now being maintained in stand-by, by Union Carbide and Carbon Corp. and has an annual capacity of 87,000 short tons. The plant at Kobuta, Pennsylvania, Plancor 483, has been operated, and is now being maintained in stand-by, by the Koppers Company, Inc., and has an annual capacity of 128,000 short tons. These are the only facilities of any sort offered for lease. The Commission will entertain proposals for the leasing of these plants promptly and in advance of consideration of disposal of the other facilities. Such leases may run for not less than 1 nor more than 3 years. Proposals for the purchase of these facilities will be received in the same manner as prescribed for the purchase of the other facilities.

The Rubber Producing Facilities Disposal Act of 1953 prescribes in detail, as well as generally, procedural and substantive standards pursuant to which the sale of these facilities by the Disposal Commission is to be effectuated. To facilitate compliance with these standards the Disposal Commission has prepared Instructions for the Submission of Proposals, which set forth the requirements of the Commission with respect to such proposals, and copies thereof will be available upon application to the Secretary of the Commission. Subject to the foregoing, the following additional information concerning the program of sale is announced:

CONTINUED OPERATION OF PLANTS: As a condition to sale, the Commission is required to be satisfied that the prospective purchaser actually intends to operate the facility or facilities for the purpose of manufacturing synthetic rubber or its component materials. The purchaser must also agree to comply with the terms of a "National Security Clause", having terms, conditions, restrictions and reservations which will assure the prompt availability of the facilities, or facilities of equivalent capacity, for the production of synthetic rubber and the component materials thereof for a period of 10 years from the date of the contract. In consonance with these requirements, while the Commission will entertain proposals for the acquisition of portions of the productive capacity of particular facilities, as further discussed in the Instructions for the Submission of Proposals, it will not entertain proposals for the piece-meal acquisition of individual items of equipment except such items as are listed in the inventory of miscellaneous equipment referred to above.

FINANCING: Proposals for purchase shall provide for the payment of not less than 25% of the purchase price in cash, and the remainder may be financed by a first lien purchase money mortgage maturing in not more than 10 years and providing for periodic amortization (amortization in equal annual instalments is not required). The interest rate upon the balance of the purchase price represented by the mortgage shall be 4% per annum.

Proposals for purchase shall be accompanied by a deposit of cash or United States Government bonds of face amount equal to 2½ per centum of the gross amount proposed to be paid but not exceeding $250,000 for each facility; provided, however, that the deposit required in the case of a proposal for one of a number of facilities on an alternative basis shall be the same as would be required if such proposal were for only the facility for which the highest amount is proposed to be paid. Except in the case of purchasers, deposits shall be refunded without interest. In the case of purchasers, deposits made hereunder shall be applied without interest to the purchase price.

PROCEDURE SUBSEQUENT TO THE SUBMISSION OF PROPOSALS: During a period of 7 months (unless extended by the Commission upon adequate notice to those submitting proposals) following the termination of the period for the receipt of proposals, the Commission will negotiate for the sale of the facilities with those who have submitted proposals. In accordance with the terms of the Act, negotiations for the sale of each type of plant (i.e., GR-S, GR-I, Butadiene, et cetera) will be limited to those persons having submitted a proposal for the purchase of such a type plant. Such negotiations will be conducted with due regard to the several purposes of the Act that the disposal of the synthetic rubber producing facilities establish a free, competitive, synthetic rubber industry, afford small-business enterprises and other users, the opportunity to obtain a fair share of the end products of the facilities sold and at fair prices, be consistent with national security, and realize full fair value for the facility or facilities, taking into consideration the policy set forth in Section 2 of the Act.

For further information and details apply to Ferris B. Thomas, Secretary.

Holman D. Pettibone,
Leslie R. Rounds,
Everett R. Cook,
Commissioners

November 18, 1953

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DECEMBER, 1953
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Table of Contents

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Market Reviews

Statistics

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A Plan for Synthetic Rubber Research and Development

THE discussion which has been going on in the editorial columns of India RUBBER WORLD regarding the future of research on rubber indicates clearly that any plans which may be made for fundamental research must necessarily take into account the probable future conduct of applied research, development, pilot-plant operation, and manufacture. Such plans should also provide for meeting both the immediate and the long-range needs of government and industry and should determine the roles that each should play in the conduct and the support of the work. In order to stimulate the consideration of specific plans, a proposal is here presented for the continuation of two activities—fundamental research and the operation of a pilot-plant and evaluation laboratory. Government support of these activities is advocated for a transition period during which industry is expected to develop an organization adequate to conduct them on a scale commensurate with national needs.

Synthetic Rubber, a New Industry

The production of synthetic rubber is a new industry; it is essentially a chemical industry, and, as such, it is quite separate and distinct from the manufacture of rubber goods. Failure to recognize this distinction has led to the widespread misconception that the production of synthetic rubber is a logical function of the firms which make rubber products. It is quite true that many rubber manufacturers are vitally interested in the production of their own elastomeric raw materials, but such production is related to their major function of making rubber goods only to the same degree as the operation of a rubber or a cotton plantation or a carbon black plant by a tire manufacturer. Likewise, the research on the manufacture of rubber goods lies in a field that is quite distinct from research pertaining to the production of synthetic rubber. Up to the present, various synthetic rubbers have been produced by private industry only for specialized purposes. The large-scale manufacture of a general-purpose synthetic rubber has been exclusively a government operation. Hence in selling the plants to private organizations the government is, in effect, creating a new industry. The owners of the new industry will probably include petroleum and chemical companies as well as manufacturers of rubber products.

Responsibilities of Government and Private Interests

Since, under the terms of the legislation for the disposal of the plants,[1] the government is dispersing the ownership of this new industry as widely as possible, it is important to examine all operations that should be carried on in connection with the new synthetic rubber industry in order to determine which can be left to private initiative and which should be continued, for a time at least, under government auspices.

The curent government synthetic rubber program represents a complete spectrum of scientific and industrial activities. The operations include fundamental research, background and applied research, development, pilot-plant operation, evaluation and testing, and large-scale manufacture. There is general agreement that private enterprise will be adequate to conduct manufacturing operations and the necessary supporting applied research and development, together with testing and evaluation. There are fears, however, that fundamental research, in the true meaning of the term, may not be adequately provided for in the new decentralized industry. Also, many persons feel the need of retaining a central pilot-plant and evaluation laboratory that will be available to both government and industry. Others, however, think that the pilot-plant operation is unnecessary, and that industry will give ample support to research of all kinds. The determination of policy should be made with a clear understanding of the significance of these activities and their long-range importance to all concerned.

Fundamental Research

Many of the differences in the current discussions of the future of research on synthetic rubber stem from differences in what is meant by research. The President's Scientific Research Board[2] differentiated three categories of research: fundamental, background, and applied.

Fundamental research is defined by the Board as, "Theoretical analysis, exploration, or experimentation directed to the extension of knowledge of general principles governing natural or social phenomena." This

[1] Public Law 205—Eighty-third Congress. Approved August 7, 1953.
[2] "Science and Public Policy, Vol. 2, The Federal Research Program," pp. 300, 311-14. Government Printing Office, Washington, D. C. (Sept. 27, 1949).

definition would clearly exclude much of the "basic" research that some correspondents have felt should be carried on by the plants under private management.

Background and applied research differ from fundamental research in that both can be planned in advance to reach objectives that are clearly defined before the work is undertaken. Specific practical ends, however, cannot be foreseen from fundamental research. Many who pay tribute to epochal fundamental researches such as those of Nieuwland or Kipping would scarcely have been willing to have recommended support for such work before it was done.

While many criteria may be applied to differentiate fundamental and applied research, two questions will often suffice to make quick judgment regarding any proposed research project: First, would the proposed investigation be appropriate for a Ph.D. dissertation? Second, would the proposed investigation be likely to lead to a patent? In general, if the answer to the first question is yes, the project represents fundamental research; if the answer to the second question is yes, the project is applied research.

The principal objective of the research that has been conducted by the government thus far has been to support and improve production. With the sale of the plants the responsibility for this type of research should be assumed by those who buy the plants, and the government should direct its efforts toward fundamental research. The new objective should be to replenish and greatly to enlarge the storehouse of scientific knowledge so necessary both to the national security and to the continued growth of industry. Much of the basic knowledge on which the present synthetic rubber industry was founded came from academic research in Europe, which is now greatly curtailed. If American industry is to continue to develop it must support long-range fundamental research as well as applied research from which immediate results can be obtained. By its very nature fundamental research must be done on the broadest possible base because there is no way to determine what investigation or program will lead to useful results or how long before even a large investment will begin paying dividends. Such being the case, few firms can afford to initiate and support programs of fundamental research of substantial size. Hence, until the new synthetic rubber industry can organize to finance and operate a strong fundamental research program, it is essential that the government take the lead and retain those parts of the program which should be continued. Otherwise most of the highly productive investigators now in the program may turn their efforts to other fields.

AS PROMISED on our editorial page in October and as a result of discussions which began in Washington, D. C., in August, with persons interested in the future of synthetic rubber research in the National Science Foundation, the National Bureau of Standards, the Reconstruction Finance Corp., and elsewhere, the thoughts of these several persons have been assembled and are presented herewith in article form under the heading of "A Plan for Synthetic Rubber Research and Development." It should be emphasized that the plan, in its entirety, does not necessarily represent the thinking of all, or even a majority, of those consulted.

The article and the plan are presented to stimulate thinking on the subject of the future of synthetic rubber research and development, with special reference as to what, specifically, should be done and how it might be carried out. Numerous other comments on the subject have appeared on our editorial pages from July through December. *Editor.*

GR-S Plant Operated by Firestone Tire & Rubber Co., Akron, O., Center Foreground; The Government Laboratories Operated by the University of Akron, Right Foreground

Government Laboratories

Many needs of both government and industry will be served by the maintenance and expansion of the present pilot-plant and evaluation facilities operated by the University of Akron. Any new manufacturing process or procedure must be carried through a pilot-plant stage; yet large, well-equipped pilot plants are expensive and are not available to many small firms, and even a large firm may not possess all the different kinds of equipment it needs in its own pilot plant. The new synthetic rubber industry may well attract many companies not now participating in the government program if a pilot plant is made available to serve their needs on a confidential basis.

The military services, likewise, need a pilot plant for the development and small-scale production of special polymers of a non-commercial character. It would be technically impractical, difficult from the standpoint of security, and prohibitively expensive to undertake to make these special polymers by the use of factory-scale production facilities. However, with a pilot plant available to serve them at all times the defense agencies could quickly obtain polymers needed for critical applications, and processes for large-scale production could be worked out at the same time, if desired.

The Proposed Plan

The need of a fundamental research program on an expanding scale and for the continuation of the pilot-plant operations at the Government Laboratories can best be met by placing the immediate responsibility on the National Science Foundation and at the same time working toward the establishment of a strong and active American Rubber Institute. The National Science Foundation would operate with funds set aside from the sale of the plants and would collaborate in the development of an industry-supported institute which would take over the activities after a reasonable transition period.

National Science Foundation

The National Science Foundation has very broad responsibilities for the formulation of national scientific policy and for the initiation and support of basic scientific research. It has the statutory authority[3] that would be needed to conduct the fundamental research on synthetic rubber as well as to take the responsibility for the Government Laboratories.

In administering fundamental research on synthetic rubber, funds would be given as grants rather than through research contracts, because contracts involve the obligation to carry through specified operations and, if possible, to deliver specified results. Fundamental research by its very nature must be done with the maxi-

[3] Public Law 507—Eighty-First Congress. Approved May 10, 1950.

mum freedom from restraint. Adequate assurance that money will be spent wisely can be had by awarding grants on the basis (1) that the proposed investigations bear some reasonable relation to polymer science and (2) that the investigators be scientists of recognized ability. The basis for the continuation of any given grant should be the production of high-quality scientific work as attested by its being published and recognized as significant by other scientists in the same or related fields.

Pilot-Plant Operation

It has been proposed that the Government Laboratories, consisting of evaluation and chemical laboratories as well as pilot plant, be sold to the University of Akron for a nominal sum, and that the University operate them for the benefit of both private industry and the government. This plan, to be successful, requires a specific provision for funds to insure uninterrupted and efficient operations with a varying work load, and to provide for the continual improvement of facilities to meet the needs of the rapidly developing synthetic elastomer and polymer industry. The over-all interests of the government and the specific needs of the defense agencies are such as to warrant explicit authorization that the Foundation make such grants to the University as necessary to keep the laboratories staffed adequately at all times, and to maintain and improve the equipment. The grants would, of course, represent only a fraction of the operating costs since the direct costs of services would be borne by users.

Funds for the Transition Period

Since the direct appropriations to the National Science Foundation would be quite inadequate for the activities described in the preceding paragraphs, it would be logical and practical to set aside a portion of the proceeds from the sale of the plants as a trust fund to be administered by the Foundation. This fund should be adequate to conduct an increasing amount of fundamental research and also to expand the facilities of the Government Laboratories and maintain their operations at an optimum level.

The transition period during which government support would be needed would undoubtedly extend over a number of years because of the time that would be required for the industry to establish an organization and put it on a sound, continuing basis, For purposes of the present discussion a period of 12 to 15 years is suggested, although with full collaboration and vigorous action on the part of industry the period might be as short as five or six years.

Twenty to 25% of the proceeds from the sale of the plans would be a reasonable fraction to be set aside as a trust fund and would yield a sum of the order of $50 or $75 million. This amount is large in terms of the usual thinking with regard to research of the academic type here advocated, but it is small in relation to the importance of the proposed activities to the government and to the national economy. It is also small in relation to the amounts that some have estimated that the industry will spend on applied research and development. Further justification for a major emphasis on fundamental research lies in the possibility that the research may result in the curtailment or the complete elimination of the need of a government owned stockpile of natural rubber, with the attendant expense.

[4] "Research Cooperation in the Rubber Industry." *Chem. & Eng. News*, 15, 21, 469 (1937).

[5] "Rubber Research and the Need for a Rubber Research Institute in the United States." Goodyear Medal Award Address before Division of Rubber Chemistry, A. C. S., Boston, Mass., May 24, 1949. Unpublished; see, however, India Rubber World, June, 1949, pp. 337, 349, 350.

An American Rubber Institute

The fact that the rubber product industry has long refrained from engaging in any major cooperative scientific enterprise does not mean that either it or the new synthetic rubber producing industry will be reluctant to establish and support a rubber institute. The idea of an American Rubber Institute has been under consideration for nearly a generation with the able support of such leaders of the scientists in the industry as Geer[4] and Fisher.[5] It may be that a definite proposal from the National Science Foundation would provide the necessary incentive to action.

The National Science Foundation should plan and conduct its activities in such a way as to aid and encourage industry to take them over as soon as it demonstrates the capacity to do so on a sound, continuing basis. The transition should be gradual, with the Foundation decreasing its expenditures as the funds raised by industry increase. When the funds available to the Institute reach a specified level, the Foundation should terminate its activities and turn over any unspent balance of the trust fund to the Institute to serve as a capital fund for the latter.

The level at which this transition from the Foundation to the Institute might be effected should be fixed only after the consideration of a number of factors. For purposes of discussion, it is suggested that the transition be made when the annual income of the Institute reaches $\frac{1}{10}$ of 1% of the gross income of the entire rubber industry. At present this $\frac{1}{10}$ of 1%-figure would amount to more than $500,000 from the manufacture of synthetic rubber, and about $5,000,000 from the production of rubber goods.

A transition similar to the one here proposed occurred on a much smaller scale in the shifting of research activities from the Textile Foundation to the Textile Research Institute. The Textile Foundation was established by Herbert Hoover with funds from the sale of German dyestuff patents in World War I. The Foundation, after a few years of limited operation, embarked on a program of spending its capital assets. When its assets were near exhaustion, it planned and consummated an arrangement with the industry-supported Textile Research Institute whereby it turned over to the latter its laboratory at Princeton University and the residue of its funds. This transition was accomplished with no interruption of the research activities.

There is every reason to think that a similar transition could be effected between government and industry supported activities in rubber, particularly with the encouragement that the sooner an institute was established on a sound basis, the larger would be the capital fund that it would receive. If, however, the plan should not materialize, any unexpended balance of the trust fund after a specified number of years could revert to the Treasury, and operations on the part of the government should cease.

Coordination of Activities

Under the proposed program the National Science Foundation should continue and extend the exchange of information among research workers and others, the publication of results, and the related activities that have been fostered by the Reconstruction Finance Corp. in its able administration of the synthetic rubber program. The Polymer Research meetings of the type conducted by RFC could be continued with profit, and in addition special conferences after the pattern of the Gordon Research

(*Continued on page 357*)

Butyl Rubber Compounds for Curing Bags

A. F. Sayko[1]

BUTYL rubber,[2] by virtue of a low degree of unsaturation, is not readily attacked by oxygen, ozone, acids, alkalies, and other chemical agents which are harmful to natural rubber. Prolonged exposure of Butyl rubber to high temperatures, however, results in a gradual degradation or reversion which is characterized by a softening of the rubber vulcanizate. As is well known, natural rubber under the same conditions shows a softening effect, which is followed by a hardening usually attributed to cyclization.

The age-resistant properties of Butyl, as compared to natural rubber, indicate that automotive curing bags prepared with Butyl would offer increased service life.[3] One obstacle, however, is the natural tendency toward softening or polymer degradation after exposure to high-temperature steam and air. This softening inside the curing bag is reflected in plugged valves, with a resultant shortening of the bag life. The loss in resilience and abrasion resistance after prolonged rough usage also would tend to lessen the number of "heats" obtained.

This paper covers the investigations carried out in an attempt to develop suitable Butyl curing bag compounds which would give the increased age resistance desired. It is essentially a compounding study, with no attempt to study processing variables.

The relative effectiveness of the ingredients considered has been evaluated on the basis of the condition of the specimen after having been exposed to a drastic steam and air aging test. Photographs have been employed to record the effect of aging, as indicated by the degree of porosity, distortion, and Shore hardness retention.

Testing Procedure

Laboratory compounds were prepared by blending all ingredients, with the exception of sulfur and accelerators, in a #00 Banbury. The curatives were subsequently incorporated on a six- by 12-inch laboratory mill. Since it was desirable to test a specimen comparable to a curing bag section, one- by one- by two-inch blocks were prepared for each study.

All available data from previous investigations related to the curing bag problem had been obtained on the basis of the retention of physical properties after a steam-air aging test. The degree of modulus retention after aging was utilized to determine the relative age-resistant characteristics of the experimental compounds. A careful examination of a portion of the early data, however, showed that it was not possible to make definite observations regarding the comparative resistance to prolonged curing conditions since the conditions of the test itself were not severe enough to duplicate this effect.

In determining a suitable test procedure it was necessary to determine the limitations of the equipment and then to take advantage of the better features, while considering accuracy and reproducibility of the temperatures and pressures employed. It was found that short alternate exposure periods to steam and air were not possible since the attainment of a temperature of 400° F. by heating steam at 100 psi. required an appreciable amount of time, usually 15 minutes. Temperature control at 400° F. ± 5° F. was satisfactory with steam in the system; however, some difficulty was noted when air was introduced into the bomb chamber. These factors, together with the desire to approach a rapid changeover as in actual plant practice, resulted in the selection of an aging cycle which consists of:

1. A 15-minute rise in steam to 400° F.
2. A 15-minute period in steam at 400° F.
3. Thirty-minute exposure to air at 200 psi., with the temperature being allowed to fall to 330° F. during this period.

Six such cycles were necessary to produce drastic change in Butyl air-bag compounds.

As shown in Figure 1, the high-temperature aging bomb consists essentially of a six-inch seamless steel pipe approximately 28 inches in height. Heat is provided by three 1,000-watt Calrod heaters around the shell and one such heater on the top flange. Temperature is recorded and controlled by an electronic recorder graduated to a maximum temperature of 500° F. A two-inch layer of asbestos insulation prevents excessive heat loss. Steam or air is injected through a manifold, which allows for a rapid changeover in conditions. Steam is obtained from

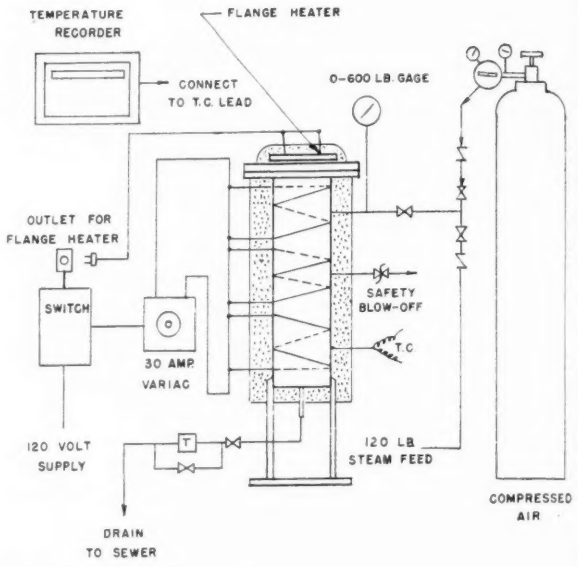

Fig. 1. High-Temperature Aging Bomb

[1] Esso Laboratories, Standard Oil Development Co., chemical division, Linden, N. J.
[2] United States patent No. 2,356,128 and others.
[3] U. S. patent No. 2,305,412.

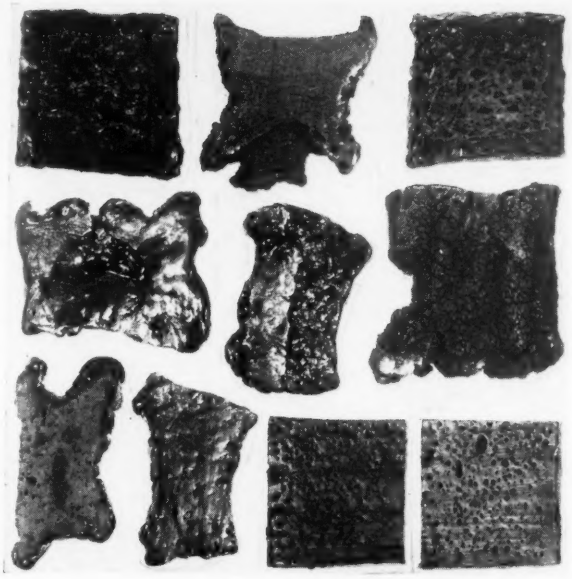

Fig. 2. Typical Aged Sections of Butyl Compounds from High-Temperature Bomb

TABLE I. TENSILE-MODULUS @ 300% ELONGATION—ULTIMATE ELONGATION

Stock	Unaged	Aged
A-5642-1	1805–1320–455	270–270–310
A-5642-2	1770–1325–430	265–260–315
A-5642-3	1660–1495–345	330–330–300

A more striking indication of the effectiveness of this aging technique is given by the appearance of sections of the one- by one- by two-inch blocks in Figure 2. These are mainly portions of poor aging compounds used to demonstrate different degrees of reversion.

An end and a center section were cut from the exposed blocks to illustrate the softening effect encountered at the surface and the porosity occurring inside the test specimens. In this manner a visual evaluation is possible, thus presenting a more realistic picture of relative age resistance. Shore hardness retention data can supplement the evaluation in cases where the aging effect is not too severe.

Effect of Curatives and Accelerator Type

Several different types of curative combinations are ordinarily employed for the vulcanization of Butyl rubber compounds. Four of the most effective types are: (1) sulfur plus accelerators; (2) Altax[4,5] plus GMF;[6,7] (3) GMF plus oxidinzing agent;[8] (4) Dibenzo GMF[9] plus oxidizing agent.[10]

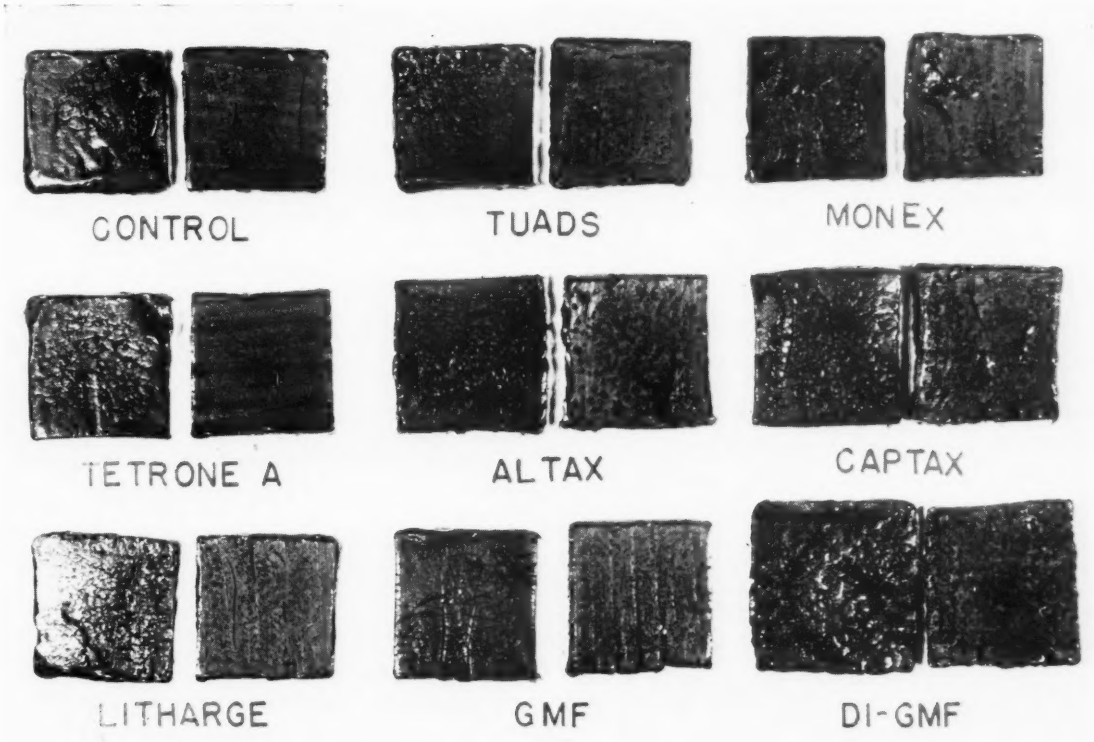

Fig. 3. Samples of Butyl Compounds Containing Various Accelerators after Aging in High-Temperature Bomb; End Section Is on Left and Center Section Is on the Right in All Instances

the 100-psi. service line, and air from a portable cylinder. Extensive tests have indicated that a factor of safety of five exists when the bomb is being operated at 400° F. and at a pressure of 200 psi. A safety blowout disk has been provided to prevent an excessive build-up in pressure. The test specimens are placed on trays made of coarse stainless-steel screening.

The data in Table 1 show the effect of this procedure on the physical properties of typical Butyl curing bag compounds.

Sulfur vulcanization requires the action of organic accelerators. These accelerators also serve to modify reversion tendencies through their effect on the vulcanization rate.[11] The tellurium and selenium derivatives of

[4] A table giving the names and addresses of suppliers of all trade marked chemicals will be found at the end of ths article.
[5] Benzothiazyl disulfide.
[6] p-Quinone dioxime.
[7] U. S. patent No. 2,619,481.
[8] U. S. patent No. 2,519,100.
[9] p-Quinone dioxime dibenzoate.
[10] U. S. patent No. 2,477,280
[11] R. L. Zapp, F. P. Ford, *J. Polymer Sci.*, 9, 97 (1952).

dithiocarbamic acid (Tellurac and Selenac) have been found to be very effective in reducing reversion in Butyl vulcanizates. These accelerators promote a more rapid vulcanization rate wherein the reversion tendencies are reduced. With a sulfur-Selenac system a minimum of one part of sulfur is necessary for a satisfactory vulcanizate. Using four parts or more of sulfur results in a poorer vulcanizate which has inferior heat resistance due to the degrading effect of the residual free sulfur. The accelerator concentration must be held between one part and four parts for acceptable results. In the present study a blend of two parts by weight of sulfur and three parts by weight of accelerator (Tellurac or Selenac) produced Butyl vulcanizates with good resistance to steam-air exposure.

The value of secondary acceleration was studied in the following formulation.

	Parts by Weight
GR-I-50	100
ZNO	25
Philblack A	60
Selenac	3
Sulfur	2
Accelerator	1

Test blocks were vulcanized at 320° F. and were exposed to six cycles of steam and air. Portions of the aged samples are shown in Figure 3. The majority of the secondary accelerators increased the tendency toward porosity and softening as compared to the control compound. In only a few cases was the degradation effect lessened. GMF, in particular, was effective in this respect. Recent experience has confirmed the value of the sulfur-Selenac-GMF combination. This combination of curatives has functioned satisfactorily in other Butyl applications involving prolonged aging conditions. It is possible that a ratio other than the sulfur-2, Selenac-3, and GMF-1 would give optimum resistance to aging.

Altax and GMF with some added sulfur have also been employed as curatives to produce excellent heat-resistant Butyl compounds. Altax acts as a mild oxidizing agent for GMF by virtue of the cleavage of the disulfide to form two mercaptan molecules. This action probably results in the same type of vulcanization mechanism as for the GMF-lead oxide type of cure. Sulfur augments the state of cure, as in the previous case. The following limits apply for the Altax-GMF-type cure.

	Parts by Weight		
	Minimum	Maximum	Most Efficient
Altax	1.0	6.0	4.0
GMF	1.0	8.0	2.0
Sulfur	0.5	4.0	2.0

Black-loaded Butyl compounds with a curative system of Altax-GMF-sulfur possess good heat aging properties. In order to evaluate the effect of other accelerators with this type of vulcanization, a poor aging compound was employed. This was achieved by substituting mineral fillers for the Philblack A. By this technique any improvement in reversion tendencies would be made obvious. The recipe for this study is listed below.

	Parts by Weight
GR-I-50	100
Zinc oxide	25
Calcene	30
Buca Clay	30
Celite 270	20
Sulfur	2
Altax	4
GMF	2
Accelerator	1

Standard one- by one- by 1½-inch blocks were cured at 320° F. and subjected to six cycles of bomb aging. Many of the exposed blocks suffered severe degradation and could not be mounted for observation. Less distortion and porosity resulted from the addition of hexamethylene tetramine, Tellurac, Selenac, and Monex.[12] The last accelerator gave the least porous cross-section. The least degradation, as gaged by the lowest Shore hardness loss, resulted from the use of Selenac. The loss in Shore during aging for the Monex compound was 32, as compared to 24 for the Selenac acceleration.

A combination of GMF and an oxidizing agent such as red lead oxide (Pb_3O_4) is capable of vulcanizing Butyl rubber.[13] Some sulfur may be added to produce a higher degree of cross-linking, thereby improving vulcanizate properties. The sulfur concentration can range between 0.5-part and four parts by weight, with two parts by weight being preferred. Satisfactory compounds are possible with a GMF concentration of from one part to eight parts by weight and a red lead-oxide content of from five to 20 parts by weight. A ratio of two parts by weight of GMF and 10 parts by weight of red lead oxide is the most efficient combination for optimum resistance to steam-air aging.

Dibenzo GMF functions similarly to GMF as a curative for Butyl rubber in the presence of lead oxide. The properties of the vulcanizate and the age-resistant characteristics are closely related to those obtainable with GMF. The concentration limits are:

	Parts by Weight		
	Minimum	Maximum	Most Efficient
Dibenzo GMF	1	10	6
Lead oxide	5	20	10
Sulfur	0.5	4	2

Similar experiments with accelerator addition to GMF and Dibenzo GMF vulcanizates indicated that Tellurac and Selenac augment reversion resistance. The latter material is preferred, however, mainly because of a higher degree of processing safety, as indicated by Mooney scorch data.

Throughout the studies on vulcanization systems and accelerator effectiveness it has become apparent that GMF and Selenac (or Tellurac) are synonymous with good heat-aging resistance. They are evidently capable of producing a high degree of chemically stable cross-linking in the Butyl rubber network, which reduces reversion tendencies. A thorough investigation of all possible ratios of these two ingredients in each vulcanization system previously mentioned would be necessary to formulate Butyl curing-bag recipes with optimum aging characteristics.

Effect of Zinc Oxide Loading

Metallic oxides, such as ZnO, play just as important a role in the promotion of Butyl rubber vulcanization as they do in other types. In the work with Butyl[14] it was postulated that ZnO, in addition to its activating effect,[15] might act as buffer against the accumulation of excess H_2S. A build-up of hydrogen sulfide concentration under conditions of high temperature can result in the breakdown of the Butyl rubber network.[16] High concentrations of zinc oxide were therefore evaluated. A trend toward increased age resistance was observed, with 25 parts by weight giving the maximum effect. The above concentration of zinc oxide was therefore employed throughout the program.

Some of the softer compounds may possess excessive tack which would interfere with smooth processing operations. This difficulty may be overcome by lowering the

[12] Tetramethyl thiuram monosulfide.
[13] I. Rehner, P. J. Flory, *Ind. Eng. Chem.*, 38, 500 (1946).
[14] F. P. Baldwin, L. B. Turner, R. L. Zapp, *Ibid.*, 36, 791 (1944).
[15] B. C. Barton, *Ibid.*, 42, 671 (1950).
[16] D. Craig, A. E. Juve, W. F. Davidson, W. L. Semon, D. C. Hay, *J. Polymer Sci.*, 8, 321 (1952).

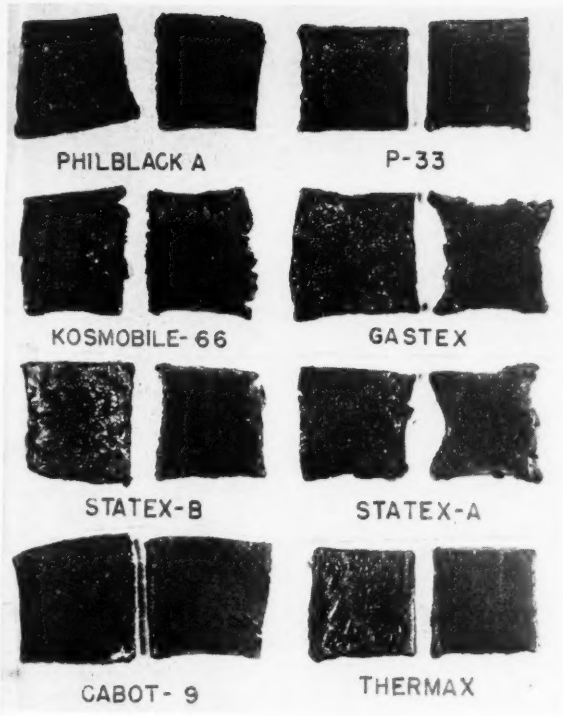

Fig. 4. Aged Samples Containing Various Carbon Blacks

zinc oxide content or by adding a small amount of a mill release agent such as stearic acid.

Effect of Type of Black

A great deal of importance must be placed on the selection of a proper black filler to be used in an air-bag recipe because of the high concentration required. Previous work had indicated that maximum processing and age-resistant properties were obtained with 60 parts by weight of black loading based on 100 parts by weight of polymer.

A series of carbon blacks was examined in a recipe having an Altax-GMF acceleration since this type of cure would give good age resistance, thus making possible a finer differentiation of aging effects. It had been found in earlier studies that the thermal blacks, P-33 and Thermax, retain the highest percentage of their original physicals after aging and, in addition, offer a greater degree of processing safety. Philblack A (MAF) and Gastex (SRF) followed the thermal blacks in retention of physicals. More pertinent conclusions may be made by examining the aged sections in Figure 4. The figure shows portions of blocks which were exposed to six cycles of steam and air. From the standpoint of porosity and physical appearance the compounds containing P-33, Thermax, and Philblack A, respectively, demonstrate good age resistance. In retention of Shore hardness, Philblack A was found superior to the other blacks, as shown in Table 2.

TABLE 2

Carbon Black	Unaged	Aged	Loss	% Loss
MAF —Philblack A	70	35	35	50.0
FT —P-33	62	24	38	61.3
EPC —Spheron (Cabot) #9	76	31	45	59.2
MPC —Kosmobile S-66	78	22	56	71.7
SRF —Gastex	70	18	52	74.2
MT —Thermax	55	21	34	61.8
FF —Statex B	70	18	52	74.2
CF —Statex A*	79	24	55	69.6

* No longer available commercially. Very similar to Statex B.

A high aged Shore value and the lowest percentage of loss of hardness show Philblack A to be suitable for the development of curing bag formulations. Philblack A also provides excellent processibility, but produces stocks which tend to be somewhat scorchy with the Altax-GMF type of acceleration. Formulation for this study was

	Parts by Weight
GR-I-50	100
Zinc oxide	25
Altax	4
GMF	2
Sulfur	2
Black loading	60

Effect of Mineral Fillers

Preliminary experiments with mineral fillers had shown some promise for their potential use in Butyl air-bag recipes. It had been noted that after exposure to *mild* steam-air aging conditions the majority of the mineral fillers imparted good age resistance; modulus retention was good; and only a slight decrease in hardness was obtained. The clays appeared particularly effective in this respect. For this study the mineral filler level was held constant at 70 volumes based on 100 of polymer. The remainder of the recipe was similar to that of the carbon black study.

	Parts by Weight
GR-I-50	100
Zinc oxide	25
Sulfur	2
Altax	4
GMF	2

Blocks were cured at 320° F.

It was quite revealing to observe the appearance of the mineral-filled test blocks after six cycles of exposure under the more drastic conditions employed in the present study. In all cases severe degradation and porosity were noted. It was not possible to mount sections of the specimens owing to the putty-like nature of the samples. Many had degraded to such an extent that they flowed together.

The softening caused by mineral fillers is also apparent when they are blended with carbon blacks, even in comparatively small concentrations. The use of mineral fillers is therefore precluded in the formulation of age-resistant Butyl compounds.

Effect of Antioxidants

A number of the more effective commercial antioxidants, together with a group of experimental antioxidants, were examined in Butyl vulcanizates. In most cases the added age resistor produced no advantages in reversion resistance during the bomb aging period. There was one exception, however, in the GMF-Pb_3O_4 type of compound. A marginal advantage was noted with the use of one part by weight of Naugatuck antioxidant #402.[17] This is apparent in Figure 5, which shows portions of aged specimens which had been prepared from the following formulation.

	Parts by Weight
GR-I-50	100
Zinc oxide	25
Philblack A	60
Process oil	10
GMF	2
Pb_3O_4	10
Sulfur	2
Antioxidant	1

Test block cured at 320° F.

Somewhat less porosity and distortion are evident in the specimen containing Naugatuck 402. The improvement is not great, as confirmed by the identical Shore hardness loss values for both the Naugatuck 402 and control compounds.

[17] No longer commercially available.

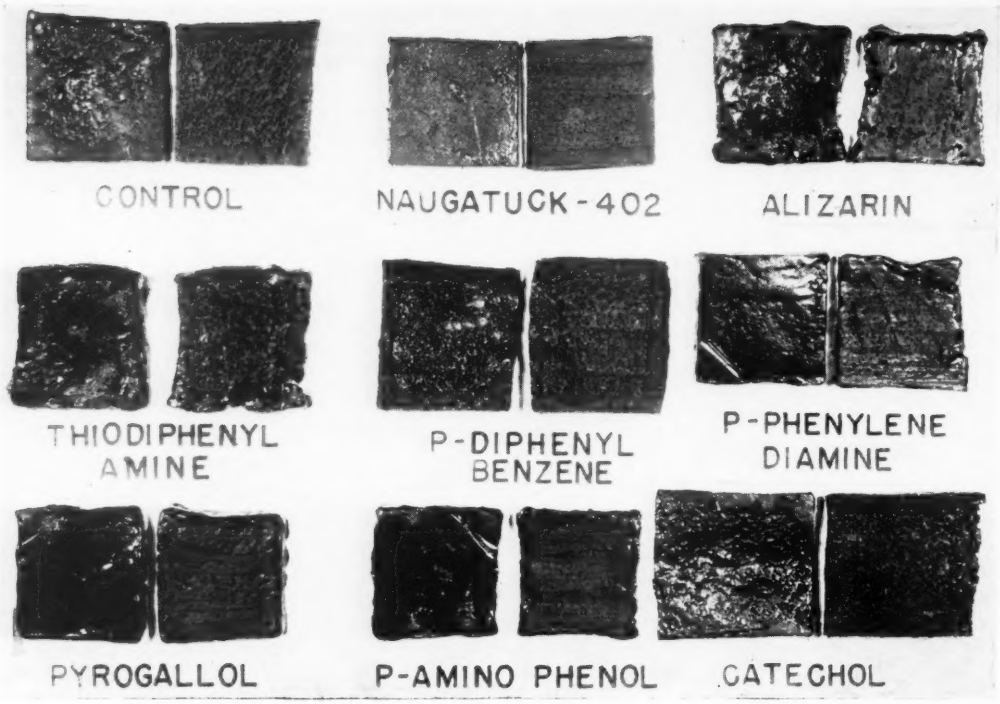

Fig. 5. Aged Samples Containing Various Antioxidants

Several of the other test specimens appeared to have aged quite well, as indicated by good retention of their original dimensions in addition to having little porosity. Examination of the aged samples, however, showed that severe degradation had occurred since the blocks were extremely soft and tacky and had a high Shore hardness loss. It was therefore concluded that the use of one part of Naugatuck 402 might be moderately beneficial in formulating a Butyl curing-bag recipe, provided a GMF type cure is employed.

Effect of Plasticizers

Various types of plasticizers are currently used in Butyl rubber to improve certain vulcanizate properties such as resilience or freeze resistance. These include high boiling hydrocarbons, esters, coal-tar products, and some resins. None of the plasticizers tested was found effective in producing better heat aging properties. In fact, all of the plasticizers evaluated in this study brought about more rapid polymer degradation. The following are some of the plasticizers tested: Mentor-28, Coray-230, Markol-JG, BRV, BRT #7, Bardol, petrolatum, dibutyl phthalate, Paraplex G-25, Resinex-70, and Durez 12687. The results suggest that Butyl curing-bag formulations should be made without plasticizers.

Effect of Retarders

Certain organic acids, such as benzoic, salicylic, phthalic, and even stearic, if used in excess, are known to have a retarding action, and are sometimes used to prevent scorching. Retarders, however, often decrease the efficiency of the accelerator, thereby producing a lower vulcanization rate. A low vulcanization rate has been considered to produce a compound which would be more susceptible to reversion when exposed to prolonged heat. One would therefore anticipate a decrease in age resistance with the use of a retarded cure. This point was confirmed by a series of experiments which employed organic acids and several types of amines as retarders.

The four curative systems were included in this study. In all instances the retarded vulcanization produced inferior aging characteristics. Although increased porosity was not noted for all samples which had been bomb aged for six cycles, they all, however, suffered a higher Shore hardness loss than the control compound. The use of retarders is therefore not recommended in heat-resistant Butyl compounds.

Polyisobutylene in Butyl

Studies made on the addition of polymeric materials to Butyl showed that the use of certain types of Vistanex[18] aided considerably in augmenting age-resistant characteristics. Specifically, the addition of five parts by weight of Vistanex B-100 to a Butyl curing-bag compound resulted in decreased porosity and softening tendency after aging.[19] This effect is quite pronounced, as may be seen by the appearance of the four exposed samples in Figure 6. Repeated tests with different lots of Vistanex B-100 established the consistency of the results. The formulation used in the preparation of these compounds was:

	Parts by Weigh
GR-I-50	100
Vistanex B-100	5
Zinc oxide	25
Philblack A	60
Altax	4
GMF	2
Sulfur	2

Blocks cured at 320° F.

Similar improvement in aging characteristics was noted also when GMF-Pb_3O_4, Dibenzo GMF-Pb_3O_4, and sulfur-Selenac cures contained the added Vistanex polymer. Based on Shore hardness measurements, the GMF-Pb_3O_4 compounds showed the highest order of age-

[18] Trade name for high-molecular weight polymers of isobutylene.
[19] U. S. patent Nos. 2,620,323 and 2,392,847.

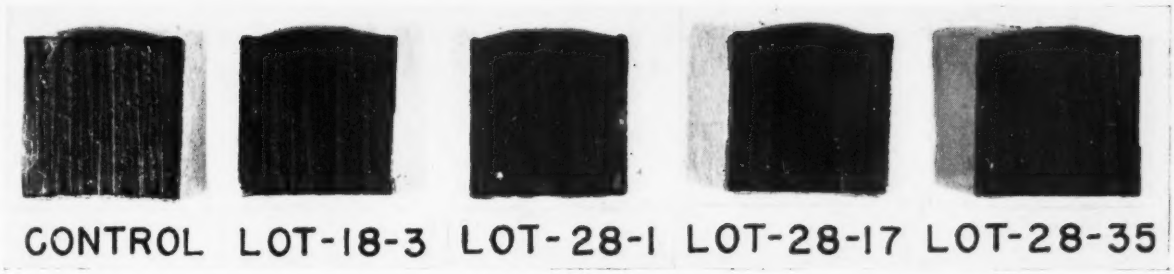

Fig. 6. Aged Samples of Butyl Compounds Containing Five Parts of Vistanex B-100

resistance improvement. The aged specimen containing the Vistanex B-100 showed a 14-point loss in Shore after aging, as compared to a loss of 39 for the control compound.

The effect of Vistanex molecular weight and concentration was examined during the course of this program. This examination was done in all types of vulcanization systems.

Data are presented in Table 3 to show the effect of Vistanex molecular weight and concentration on the Shore hardness of unaged and aged Butyl curing-bag compounds. The recipe given above was employed.

TABLE 3

Vistanex Type	Parts by Weight	Staudinger Molecular Weight	Unaged Shore	Aged Shore	Shore Loss
Control	None	.....	73	37	36
B-12	5	12,000	70	35	35
B-12	10	12,000	65	30	35
B-12	15	12,000	62	31	31
B-100	5	100,000	68	47	21
B-100	10	100,000	68	43	25
B-100	15	100,000	67	40	27
B-200	5	200,000	75	36	29
B-200	10	200,000	70	33	37
B-200	15	200,000	71	30	41
B-240	5	240,000	75	30	35
B-240	10	240,000	73	30	43
B-240	15	240,000	67	30	37

These results show an unexpected superiority for the B-100 Vistanex polymer when employed in a five-part concentration. Increased amounts of B-100 decrease this beneficial effect; while the use of higher or lower molecular weight polymers offers no advantage over the control. No attempt is made to explain this phenomenon.

It has been shown above that with a given polymer it is possible by compounding modifications to improve reversion resistance. The extent to which this improvement is possible, however, is limited by the inherent properties of the base polymer. Although a good degree of improvement in heat resistance had been obtained by the compounding approach, it is nevertheless possible that further advantages could be obtained by polymer modifications and with related polymers.

Butyl rubbers containing higher unsaturation show a moderate degree of improvement. This improvement over regular GR-I is lost, however, when Vistanex is incorporated into the compound; equivalent heat resistance then results regardless of the unsaturation level.

Butyl-A development type of polymers, which are prepared from isobutylene and butadiene, have good aging properties. Welch, Nelson, and Wilson[20] showed that in a curing-bag recipe the Butyl-A showed very little softening as compared to the standard Butyl formulation after a high temperature cyclic steam and air aging test. In fact, an increase in hardness was obtained with increased butadiene content. Best results were obtained with Butyl-A when sulfur was used rather than a GMF-type cure.

Retarding the Reversion Process

An important addition to the basic compounding studies presented in this paper is the recently published work of Zapp and Ford.[11] They found that certain metallic peroxides, such as CaO_2, MnO_2, PbO_2, and SrO_2, were very effective in retarding the reversion process in Butyl rubber. The effectiveness of the peroxides is based on their ability to regenerate the disulfide linkage by the oxidation of the thiol groups formed during exposure to high temperatures. The incorporation of this principle into a Butyl curing-bag compound together with the important features of the compounding study should make possible excellent heat-resistant properties.

Summary

A compounding study has shown that moderately improved Butyl tire curing-bag formulations can be made in the following manner. Specifically, the choice of carbon black (Philblack A), acceleration (Altax-GMF), and high zinc-oxide concentration (25 parts) leads to improved resistance to deterioration in the steam-air aging test. The use of Vistanex B-100 polymer in the compound gives additional improvement.

Butyl-A and higher unsaturation Butyl polymers give improved performance in the steam-air test.

The data presented here have been obtained to provide a basic compounding background pertaining to the use of Butyl rubber in tire curing bags. Emphasis was placed on the performance of the individual compounds in a drastic aging test. No attempt was made to study factory processing variables.

NAMES AND ADDRESSES OF SUPPLIERS OF COMPOUNDING INGREDIENTS USED

Altax	—R. T. Vanderbilt Co., 230 Park Ave., New York 17, N. Y.
GMF	—Naugatuck Chemical Division, United States Rubber Co., Naugatuck, Conn.
Dibenzo GMF	—Naugatuck Chemical Division, United States Rubber Co., Naugatuck, Conn.
Tellurac	—Vanderbilt.
Selenac	—Vanderbilt.
Philblack A	—Phillips Chemical Co., Philblack Sales Division, 318 Water St., Akron 8, O.
Calcene	—Columbia-Southern Chemical Corp., 1 Gateway Center, Pittsburgh 22, Pa.
Buca Clay	—Moore & Munger, 33 Rector St., New York 6.
Celite 270	—Johns-Manville Corp., 23 E. 40th St., New York 16.
Monex	—Monsanto Chemical Co., Rubber Service Dept., 920 Brown St., Akron 11.
Gastex	—General Atlas Division, Godfrey L. Cabot, Inc., 77 Franklin St., Boston 10, Mass.
P-33	—Vanderbilt.
Thermax	—Vanderbilt.
Spheron #9	—Cabot.
Kosmobile S-66	—United Carbon Co., Inc., Charleston 27, W. Va.
Statex A*	—Binney & Smith Co., 380 Madison Ave., New York 17.
Statex B	—Binney & Smith.
Naugatuck 402†	—Naugatuck Chemical.
Mentor-28	—Esso Standard Oil Co., 15 W. 51st St., New York 20.
Coray-230	—Esso Standard Oil.
Markol-JX	—Esso Standard Oil.
BRV	—Barrett Division, Allied Chemical & Dye Corp., 40 Rector St., New York 6.
BRT #7	—Barrett.
Bardol	—Barrett.
Paraplex G-25	—Rohm & Haas Co., Washington Square, Philadelphia 5, Pa.
Resinex-70	—Rohm & Haas.
Durez 12687	—Durez Plastics & Chemicals, Inc., 1931 Walck Rd., North Tonawanda, N. Y.
Vistanex	—Esso Standard Oil.

* No longer available commercially. Very similar to Statex B.
† No longer available commercially.

[20] *Ind. Eng. Chem.*, 41, 2834 (1949).

Modern Vulcanization Processes[1]

H. A. Freeman[2]

IT WAS only about 113 years ago that Charles Goodyear dropped rubber and sulphur on a hot stove, resulting in the first vulcanization process. If he could look in upon us today he would see a maze of curing processes which would probably strain his credulity. An outline of some of the methods used at just one rubber company is enough to illustrate the intricacies of modern curing. We will apply curing methods to certain types of rubber goods.

Rubberized Fabric—Precure

Rubberized fabric used for balloons, air boats, and the like is sometimes cured and then cemented into its final structure. From 50 to 300 yards of material are wound on to a hollow steel drum. The layer thickness on the drum may be as much as 1.50 inches. The roll is then tightly wrapped with a liner and cross wraps and placed into a vertical pot heater for cure. Cure is accomplished by simply turning on steam to the desired heat and holding this heat for a predetermined time. This method is relatively old and yet modern in the sense that it has defied several attempts at improvement over the years. Its basic principles are in effect today.

Inflated Rubberized Fabric Products

Certain inflated rubberized fabric products such as pontoons and life rafts can be built into their final structure from uncured rubberized fabric. These are held during cure to the same inflated position they assume when in use. A pontoon or "rubber log" is placed into a pot heater. An air line is attached to the pontoon's inflating valve. This air line leads to a pressure balancing mechanism which, in turn, is connected to the inner heater shell. The heater door is closed, and steam turned on. As the heater steam pressure rises, pressure is exerted on the diaphragm of the pressure balancing mechanism so that air is admitted to the inner pontoon.

The balancer so accurately controls this air ingress that a differential pressure of 0.25 psi. is maintained, not only as steam pressure rises to its desired heat, but also throughout cure. This means that when the steam pressure reaches its desired peak of say 35.0 psi., the air pressure within the pontoon will be exactly 35.25 psi.

Near cure end, air is turned into the heater steam to permit a slow drop in pressure when cold water spray starts. Water is admitted slowly to insure this slow drop in pressure. As heater pressure is released, the balancer continues to maintain the 0.25 psi. pressure differential. Thus, as the heater door is opened, the pontoon is seen mildly inflated, perfectly shaped, and ready for use.

Sheet Rubber

Sheet rubber, such as used for rubber electric pads, is also cured in a pot heater, but with another modification. The uncured rubber sheets are placed between stainless steel plates to impart a smooth glossy surface. This assembly is then placed inside a cured rubberized fabric blanket bag which looks somewhat like a mountaineer's sleeping bag. A vent cloth is ingeniously arranged to allow gases to escape, but to prevent steam from entering during cure. The mouth of the curing bag is clamped tightly shut. These assemblies are placed on a rack of heater trays, and vacuum is applied for 15 minutes before cure. The whole is then run into a horizontal heater, and the door closed. Steam is brought up to the desired heat. Air is turned into the heater steam, but the same heat maintained as with steam alone. This, too, is done to prevent a fast drop in pressure when water cooling spray is turned on at the end of the cure. Vacuum to the pad is maintained throughout cure, as this product is quite sensitive to blisters and pock mark indentations.

Figure 1 shows one of the world's largest pot heaters (55 feet long by 180 inches in diameter) being delivered at the Goodyear Akron plant.

Gasoline Fuel Cells

Gasoline fuel cells for airplanes are built upon a hollow box-like form. This form is rigid enough to support and help form the rubber tank before and during cure. After cure the form, usually of plaster or cardboard, is crumpled and destroyed. The cure process involves an interesting manipulation of air. First, air must be bled from within the cell plies of rubberized fabric by means of non-rubberized cotton cords. The cord ends are led to a conduit which extends out of the heater. Second, air is used for pressure while a relatively low heat is being maintained with heater steam, resulting in a uniform steam-air mixture during cure. Third, the steam-air mixture must be kept agitated or circulated within the cell form to break up stratification. Thus the same heat within the hollow box-form as on the outer fuel cell is maintained. This is assured by vent hoses and pipes with open end inside the box-form and outlet outside the heater. A vapor movement inside the box-form is created.

After the horizontal heater door has been closed, steam is turned into the heater to the desired temperature, say 240° F. (10 psi.). Air to 50 psi., or a predetermined pressure is admitted to the steam within the shell. The thermostatic steam control keeps the heater temperature at 240° F. regardless of the air-steam pressure. The cord bleeder line and the box-form vent lines are, of course, left open. Near the end of cure, cooling water spray is turned on slowly to insure no loss of pressure. The fuel cell comes out of the heater perfectly shaped and satisfactorily uniform in cure effect.

Hose

Hose lends itself to three types of cure, depending upon the class of hose. The lead press method, for garden and welding hose, was started a generation ago and yet is so ingenious that it is still widely used. Just before cure, the prepared hose is passed rapidly through a lead press. The lead forms a thin casing and acts as a mold. The leaded hose is rolled on to large reels which are conveyed into a horizontal heater. The ends of each hose reel are attached to a hot water line, and the hose is filled with water to a pressure of more than 100 psi. The temperature for curing is obtained by steam within the heater.

[1] Presented before the Division of Rubber Chemistry, A. C. S., at Los Angeles, Calif., Mar. 18, 1953.

[2] Goodyear Tire & Rubber Co., Akron, O.

which completely surrounds the exterior of the lead casing. The cure process terminates with water spray cooling. The lead casing is stripped from the hose, is remelted, and then is used to repeat the cycle.

Small radiator and sand blast hose is built on to a 50-foot hollow steel mandrel. Added pressure and good molding are furnished by winding cloth wraps around the hose just before placing it into a 55-foot horizontal heater, which is only three feet in diameter. Cure is given by the ordinary so-called "open steam" method. Both air and steam condensate, however, must be forced from within the hollow steel mandrels. This riddance is accomplished by swirling steam in at one end of the narrow heater to the other end, thus creating steam circulation inside the mandrel as well as on the external hose cover.

Fire hose is cured by placing its sectional lengths on a long wooden rack sloped toward one end. Steam is admitted directly to the internal hose rubber tube lining at the top of the rack so that condensate will drain immediately at the bottom end. No outside wraps or molds are required for curing the rubber lining to the strong, closely woven cotton jacket, which does not expand diametrically to any appreciable degree, while under about 35 psi. steam pressure during cure.

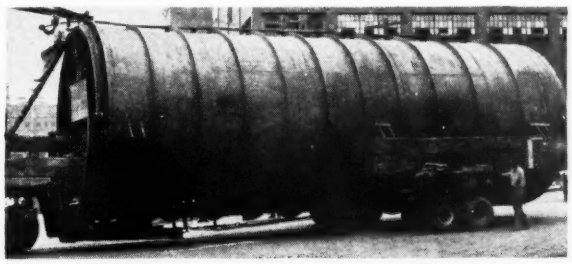

Fig. 1. One of the World's Largest Pot Heater Vulcanizers Just before Installation

Hard Rubber

Hard rubber is that type of rubber goods having from 20 to 50% sulfur. It has but little, if any, flexibility after cure. Extensive use is made of semi-hard rubber, with sulfur content around 20%, for steel tank lining. The thin sheeting on the metal, to avert corrosion, is cured to a hardness of about 95 Shore A. The cure involves the ordinary open-steam pot heater method with air in the heater for pressure.

Hard rubber industrial rolls present a more interesting problem because we deal with exothermic reaction. For efficiency, a short cure time at high temperature is desirable. This, however, may start heat of reaction and actually burn the hard rubber to a cinder. During a test cure, when the cure at 290° F. in the heater was allowed to progress too long, a reaction heat of 460+° F. was found at what turned out to be a cindered spot in the roll. Usually the hard rubber coating on the steel roll is kept to one inch or less in thickness so that excessive heat can be bled away quickly.

For cure, the hard-rubber coated steel roll is placed into a pot heater and given an "open-steam" cure, with air for pressure, followed by a water spray or a long cooling "soak" with heat off, but pressure maintained.

For example, an 18-inch O.D. hard-rubber coated steel roll had a hard rubber coat one inch thick. The rubber compound carried 40 parts of sulfur. The cure was 16 hours at 260° F. plus one hour spray in a horizontal heater. After the cure had progressed about 4¼ hours at 260° F., the heat of reaction began within the rubber

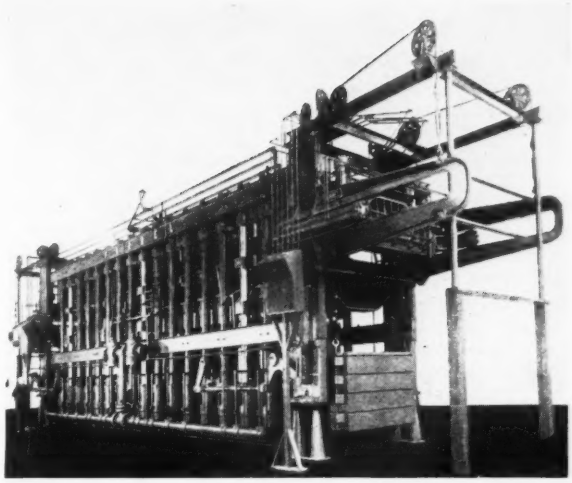

Fig. 2. Large Conveyor-Belt Press Measuring 80 Inches Wide by 40 Feet Long

and reached a peak temperature of 321° F. rapidly and then gradually dropped back to the heater temperature of 260° F.

The resulting equivalent cure calculated at 290° F. ranged from a value of from 360 to 640 minutes in parts of the roll.

As another example, a hard-rubber coated steel roll of 9¼ inches O.D. was coated with ⅝-inch hard and ⅝-inch semi-hard rubber next to the core. The blending of stocks allowed a pot heater cure as follows:

6 hours @ 260° F.
1 hour @ 275° F.
3 hours @ 290° F.
2 hours @ 275° F.
3 hours cooling under air pressure
15 hours in heater

This cure was so nicely balanced that a minimum heat of reaction occurred. The resulting equivalent cure calculated at 290° F. had a cure value of from 310 to 412 minutes on parts of the roll. A long slow cooling was necessary to avoid cracking in the hard rubber. This hard rubber curing involves not only correct heat ingress, but also the right heat egress.

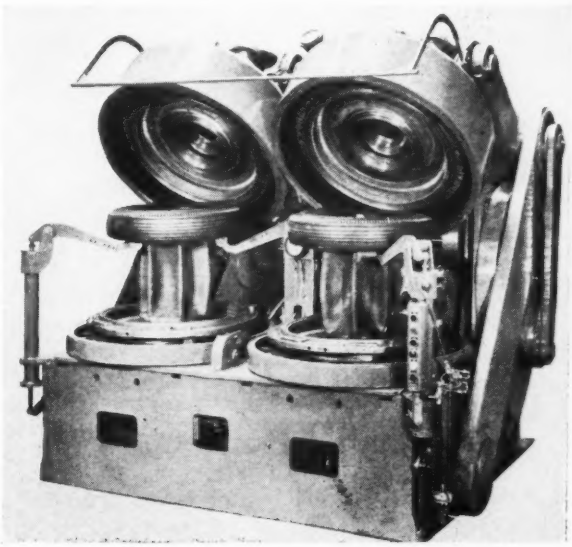

Fig. 3. Modern Tire Vulcanizer

Frothed Rubber

Frothed rubber, made from latex (but not blown rubber "chemical sponge") is fashioned into mattresses, pillows, automobile seats, and other cushions. It lends itself to several types of cures, but the two most distinctive include (1) steam jet tunnel and (2) boiling water. Frothed rubber does not require pressure and needs but very little heat (210° F.) for cure. The steam jet tunnel method uses an eight- by eight-foot tunnel, 180 feet in length. The molds with their frothed rubber products are slowly conveyed by cars on a track through the tunnel in a constant bath of 210° F. heat.

During the first 45 feet of travel hot water is splashed on to the molds, followed by steam from well-placed jets during the last 135 feet of travel. The cured product is first pressed to squeeze out as much water as possible and then dried by electronic high-frequency heat.

The boiling water cure is accomplished in a tank of boiling water through which a conveyor transports the frothed rubber units in their molds. The units are kept totally immersed in this constantly boiling water throughout the approximately 40 minutes of travel from one end of the tank to the other.

Belts

Belts are in the main divided into two types: (1) flat belts and (2) V-belts. Flat transmission and conveyor belts are usually built in lengths of 500 to 1,000 feet, run through soapstone, and taken to their platen curing press in rolls. There are single- and double-deck presses varying in length from 15 to 41 feet and from 40 to 84 inches in width. The presses are equipped with let-off and wind-up facilities capable of handling belt rolls weighing as much as 27,000 pounds and measuring 10 or 11 feet in diameter. (See Figure 2.) Stretching devices are provided to permit curing under tension. The belts are cured a section at a time: each section measures the length of the press. The ends of the press platens are variously equipped with means of tapering off the temperature to prevent premature cure in the press lap. If the body of the press is carried at 275° F., the cold end may start at 190 to 240° F. and taper to 275° F. in a matter of 10 or 12 inches, thus allowing the press laps to be cured close to the amount received by the section part within the press body. Various means, such as steam, circulating water, or empty chamber, are used to condition the cold end.

Flat belts are also "Roto-Cured." The equipment consists of a 60-inch diameter hollow steel drum filled with steam. This drum is about three quarters surrounded by steel steam-chambered "shoes" spaced just far enough from the drum to allow the belt to pass between drum and "shoe." A steel pressure belt applies pressure to the rubberized fabric belt as it is being slowly rotated around the drum for cure. The belt being cured travels around the drum at a speed of 0.3- to 0.6-foot per minute, depending upon belt thickness.

V-belts are still cured occasionally by the old "wrap cure" method. A series of metal rings acts as split molds to form the bottom and the sides of the belt. These molding rings are designed so that they may be stacked to take as many as 40 cavities in a unit, which is provided with a pin and web device. Cotton wraps are used for top molding pressure. The assembly is then given a regular "open steam" pot heater cure.

The "full molded reverse cure" is used for V-belts up to 120 inches. Before being placed in a single-cavity steel mold, the endless belt is shaped around an inner annular steel ring. If this ring can be kept hot from one cure to another, total cure time of the belt can be reduced over a cold ring start. The volume of the belt is extremely critical in this curing method, but it has definite advantages for curing steel cable belts, where it is important to keep an exceptionally accurate cord lay.

The "open side press cure" handles V-belts as long as 740 inches. The green belts are placed on an assembly that resembles a two-pulley horizontal multi-V-belt drive except that, between the multi-pulleys, the belts pass between the platens of a press. When the press is closed, a multi-grooved mold on the upper and on the lower face of the center platen forms the bottom and two sides of the belts; while the faces of the upper and the lower platens form the top side of the belts. When the first sectional cure is completed, the press is opened and the pulleys are rotated so that the next green sections of the belts are brought between the platens for cure, and this process is repeated until all sections of the belts are cured. The platen press ends are "cold ended" in about the same way as for the press cure of flat belts.

Heels, Soles, and Molded Goods

Heels, soles, and molded goods are usually cured in a multiple-deck press. For heels, the old method of laboriously opening each mold by hand and then loading it singly in the waiting press has been replaced by a fully automatic method. Machinery opens the press, shoves out the six or eight molds for loading, and shoves the mold back in the press again. Thus, with no need to manipulate the molds manually, female operators can place the raw heel slugs into their intended mold cavities and, at the end of cure, handle the cured heels.

A modern modification of the simple platen press cure, particularly for molded goods, is the use of electronic high-frequency current for warm-up before mold cure. The uncured rubber slugs, prepared for molding, are placed on a metal grid in a field of electronic high-frequency current for this preheating. The internal, as well as external, heating applied to the raw rubber stock, before mold insertion, shortens the press cure enough to make this type of preheatnig economical and efficient.

Inner Tubes

Inner tubes for tires are now cured in individual vulcanizers or watch-case molds. A steam jacket or chamber is built around each mold so that the tube is cured in dry heat. This procedure means that heat comes to the tube from the mold surface rather than from direct contact with steam during cure. Tubes are so thin that they can be given a relatively short cure—as low as five minutes—for a passenger tire tube. The determining point of cure is the valve patch. When the rubber around the tube valve is properly cured, the body of the tube has received more than enough cure.

Tires

Tire cure methods can only be here mentioned because the breadth of this field prevents detailed presentation. Tremendous strides have been made in the reduction of overall cure time. About 30 years ago 140 minutes of cure time elapsed in curing a 6.00x16 tire with air inflation, by the old pot heater method. Today this same tire can be cured in complete cycle from mold closing to opening in only 20 minutes by means of the automatic individual vulcanizer. (See Figure 3.) Even in the pot heater cure, time has been reduced to less than one-third during this 30-year period.

Considering only the individual vulcanizer, the type of tire cure is usually designated by the internal cure

treatment through the airbag. The external tire heating through the mold is accomplished by placing the mold into a bath of steam or between steam platens. All of the following airbag inflation treatments are in effect today: (1) high-pressure air; (2) high-pressure steam followed by higher-pressure air; (3) high-pressure steam followed by lower-pressure steam; (4) high-pressure steam followed by dead-end cold water; (5) circulating hot water; (6) high-pressure steam followed by dead-end hot water; (7) high-pressure steam followed by lower-pressure steam followed by dead-end cold water.

The above, of course, does not exhaust the list, but will serve to illustrate the wide possibilities in tire cure manipulation. The aim is to give the tire the shortest possible cure time consistent with maximum quality for best performance in tire service.

Summary

In this parade of vulcanization processes a relatively few from the host of rubber products have been cited. To these, 27 curing methods have been applied to show possibilities in cure manipulation. Since the day of Charles Goodyear some progress has been made in the art of curing rubber goods.

The author acknowledges with thanks the kind permission of R. P. Dinsmore and F. J. Dugan to publish this paper and to H. W. Wilson, J. E. Burwell, J. F. Kersher, F. O. Leonard, O. L. Williams, E. C. Montgomery, and J. M. Lederman for help in compiling these cures.

Synthetic Rubber Research

(*Continued from page 347*)

Conferences[6] could be set up in accordance with suggestions that have been made. Cooperation between research groups and the Government Laboratories would be mutually advantageous, and even those engaged in research quite removed from any practical applications would find stimulation and interest in acquaintance with the industry through the Laboratories. This function of informal coordination would, from its nature, be one of the first functions to be turned over to an Institute.

[6] Sponsored by the American Association for the Advancement of Science, Washington, D. C.

New Materials

Molding Material—Resinox 3700

A NEW thermosetting molding compound, Resinox 3700, has been developed by Monsanto Chemical Co., Springfield, Mass., for use in arc-resistant parts. Electrical and physical properties of the new material which make it applicable to this use are given as follows: arc resistance, 184 seconds in standard ASTM tests; dimensional stability and moldability (including transfer molding properties), excellent; and impact strength and heat resistance, relatively good.

Plasticizer for Rubber

A NEW chemical plasticizer, designated RPA No. 6 by the manufacturer and known chemically as pentachlorothiophenol, is being produced by E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., for use with natural rubber and with hot, cold, and oil-extended GR-S types. The new material is claimed to be a non-dusting, free-flowing, gray powder having a slight terpene odor. Excellent storage stability under normal conditions and no toxic effects, when used according to described procedures, can also be expected of the compound, it is claimed.

RPA No. 6 has a specific gravity of 1.72 and is characterized, according to the company, by the following properties: a high degree of activity over a range of temperatures from 212-350° F.; short breakdown times; effective in both Banbury and open mill mastication; excellent stability; and no effect on curing properties of the elastomers into which the plasticizer is incorporated. Quantities recommended for use in natural rubber vary from 0.05-0.2-part; in all types of GR-S, the amount increases to 0.5-2.0 parts per hundred.

Incorporation of the plasticizer into natural rubber in laboratory tests has indicated the compound to be an effective peptizer at mill temperatures down to 212° F. It is further claimed that the efficiency of the plasticizer increases as the mastication temperature rises, and that its use does not materially alter the tensile strengths of the cured stock.

When used in GR-S types, the following was concluded from test data: considerable plastication of GR-S 1000 is obtained in five minutes; with one part RPA No. 6; great reduction in the plastication time of GR-S 1500; elimination of resistance to mechanical breakdown of GR-S X-628 (oil-extended, cold polymer), with considerable plastication obtainable with as little as 0.5-part; and effective increase of the plasticity of GR-S X-629 (cold, HAF black, oil-extended polymer) with concentrations as low as 0.5%.

Odorless Paint Driers

RUBBER based paints can now be formulated with odorless naphthenate drying accelerators that do not affect the qualities of the coating, according to a recent announcement of Witco Chemical Co., 260 Madison Ave., New York 16, N. Y. These drying compounds, designated Odorless Lead and Odorless Cobalt Driers, whose odors are said to be virtually imperceptible to the human sense of smell, are recommeneded for use in the same concentrations as earlier Witco driers with comparable results. Their specifications are given as follows:

	Cobalt	Lead
Metal constituent, %.....	6	24
Non-volatile components, %.	63	64
Specific gravity, 25° C.....	0.900	1.135
Solubility, raw linseed oil....	24 hrs. clear	24 hrs. clear
Flash point (TCC), °F.....	100	110

Extender-Type Vinyl Plasticizer

A NEW, partially hydrogenated alkyl-aryl hydrocarbon material, known as HB-20, is available from Monsanto Chemical Co., St. Louis, Mo., for use as a plasticizer in vinyl compounds. In particular, the company recommends the product for pigmented and colored vinyls, although results of its use in polystyrenes, ethyl cellulose, and asphaltic compositions also show promise.

The liquid compound is described as practically odorless and non-toxic and is reported to cost less than several similar products. The physical properties of HB-20 are given as follows: color, water-white; specific gravity, 0.971; refractive index, 1.5470 at 25° C.; viscosity, 55.7 Saybolt universal seconds at 100° F.; pour point, —54° C.; flash point, 160° C.; flame point, 182° C.; aniline point, —15° C.; and distillation range, 312-370° C.

Editorials

American Rubber Industry at the Crossroads?

SOME may feel that the above heading for the following discussion is a little too trite or overworked, but we feel that the rubber industry in the United States is indeed approaching one of the most important crossroads in its history and that every effort should be made to indicate what lies down each fork of the road. The above heading is therefore particularly appropriate at this time.

The rubber industry has enjoyed phenomenal growth during the past decade; its total sales volume is now more than $5 billion a year, and its profits in 1953 will probably be at near-record levels. With this growth have come increased responsibilities, and the degree to which the industry will continue to accept these responsibilities was the subject of a talk by Congressman Paul W. Shafer, of Michigan, author of the Rubber Act of 1948, as amended, and chairman of the House Armed Services subcommittee on rubber, before The Rubber Manufacturers Association in New York on November 17.

Shafer told the Association that "we stand today on the threshold of a great decision and that decision may well determine whether the rubber industry will exist part government owned and part free. It may even be," he added, "that your industry will be the first to succumb to industrial socialization, the ultimate penalty you may pay unless you firmly resolve that this great new synthetic industry will be privately owned, privately expanded, privately financed, and privately operated."

The Congressman said that if any of the rubber companies were entertaining thoughts of quick profits, low bids, and easy negotiation, they would "open the door to the greatest avalanche of condemnation ever heard in the halls of Congress."

Shafer added that he realized that few, if any, of the companies would knowingly endorse the continued ownership by the government of our synthetic rubber facilities, but the greater issue at stake in the whole matter was that government ownership of the raw materials of one basic industry could well mean ever-increasing intervention in other basic industries. The present national administration is trying to reverse this trend, but there are many in government in Washington who feel that the synthetic rubber industry should remain a government monopoly.

"And you who are in the policy level of this industry have a responsibility to millions of Americans. It is a responsibility so staggering that sometimes it is easier to forget. I congratulate you on your past accomplishments. I wish you well for the future," Shafer told the Association members and guests.

During the past several months India RUBBER WORLD has been trying to stimulate thinking in the rubber industry by a series of editorials reporting the results of a survey of research and development administrators on the future of fundamental research on synthetic rubber. The lead article in this issue presents what we have found to be the thoughts of several interested persons at the policy making level in the National Science Foundation, the National Bureau of Standards, the Reconstruction Finance Corp., and elsewhere, on this subject.

Although the thoughts in this article are those of men in government, the plan that they propose is not one of permanent federal sponsorship of fundamental research on synthetic rubber.

"The need of a fundamental research program on an expanding scale and for the continuation of the pilot-plant operations at the Government Laboratories can best be met by placing the immediate responsibility on the National Science Foundation and at the same time working toward the establishment of a strong and active American Rubber Institute. The National Science Foundation would operate with funds set aside from the sale of the plants and would collaborate in the development of an industry-supported institute which would take over the activities after a reasonable transition period," the article states.

The transition period was suggested as from 15 to five years, depending on the extent of collaboration and the vigor of the action in this connection on the part of the private synthetic rubber industry.

India RUBBER WORLD commends the proposed plan for study to top management and research management in the rubber and associated industries and to the Rubber Facilities Disposal Commissioners. There is a real problem in the field of research as there is in the field of the production of synthetic rubber, both of which must be solved satisfactorily in 1954. As Shafer stated in his talk before the RMA, there is a greater issue at stake than the sale of the synthetic rubber plants to private industry. The danger is increased intervention of government in the production of raw material for a basic industry. In the field of research, particularly fundamental research, the majority of the replies to our questions regarding who should best do this type of research in the future indicated that private industry should and would do this research.

There is an obvious need of a reasonably long transition period in the research field, however, and the above-mentioned plan seems to be a very well thought-out means of making the transfer fro government to industry, without the danger of loss of men and knowledge which might result from a too-abrupt termination of the present government sponsored program.

R. G. Seaman

The Electrostatic Properties of Rubber and Plastics[1]

H. A. Endres and W. T. Van Orman[2]

IT IS the purpose of this paper to review the phenomenon of accumulation of electrostatic charges in rubber and plastics, the hazards accompanying uncontrolled electrostatic discharge, means of controlling or dissipating the charges, and to describe a useful application of this property of certain plastics.

Everyone has experienced the shock resulting from touching a grounded metal object after he has accumulated an electrostatic charge by walking on a rubber or plastic floor covering. The development of an electrostatic charge in this manner recalls the classic experiment in physics of rubbing an ebonite rod with a piece of silk or cat's fur and then picking up bits of paper by electrostatic attraction. In these instances the charge developed is of relatively low magnitude, and while it may be sufficient to produce a spark, it is harmless except under very unusual circumstances. However, when an electric charge is developed in an industrial process, the conditions are usually such that more and more charge will accumulate until it exceeds the insulating ability of the surrounding air and then escapes as a spark of sufficient magnitude to constitute a definite fire hazard or source of mechanical trouble. If such sparks are produced in areas containing flammable gas or dust, serious fires or explosions may result.

A spectacular result of a natural self-charging mechanism is seen in lightning. Vertical currents, rushing through water droplets, break them up and create electrical charges in the surrounding air. From these tiny charges, lightning discharges of six miles in length may be generated. Voltages as high as 100,000 per foot may be encountered, and currents up to 200,000 amperes have been measured.

Development of Electrostatic Charges in Rubber and Plastics: Hazards and Control

Silsbee (1)[3] presents an interesting table of crest values for triboelectric sparking voltages and reaches the conclusion that a potential of about 28,000 is required to produce a spark one inch long between needle points. Measurements made with an electrostatic voltmeter on plystock coming from a calender have shown potentials as high as 50,000 volts, which would be sufficient to produce a spark more than two inches in length. In all the processes of the rubber industry where textile fabrics are being coated either by spreading or by calendering, or where the rubber coated stock passes over rolls, electrostatic charges are developed. As a result of its extremely high resistivity, the rubber coating, when once charged, will retain its electrification for a period of time determined by the prevailing conditions. Also because of its high resistivity, the rubber cannot be de-electrified by simple contact with a ground. Ionization of the ambient atmosphere relatively close to the stock is perhaps the most effective way of removing the charge. This can be done by means of electrically operated static eliminators, or by radiation emitted from radioactive materials such as polonium, which will be discussed later.

Before the introduction of these more recent methods of static elimination it was common practice to remove the charges by proper grounding of the equipment, materials, and personnel. Such devices as contacting the charged material with metallic tinsel cord connected to a ground, or passing the material close to a row of closely spaced sharp metal points projecting from a grounded metal rod have been employed. Moving equipment and personnel can be grounded by means of conductive floors containing metal inserts, or by conductive rubber floor coverings.

The principle of electrically operated static eliminators, according to Pennell (2), is to provide a localized alternating ionized field through which the charged material passes, instantly and completely losing its static charge by neutralization and thus restoring the electrical balance. This is "neutralization by ionization."

Another method of preventing the accumulation of electrostatic charges that is widely used is by humidification. Most insulating materials have the property of absorbing a thin layer of moisture which usually contains enough dissolved material to render it slightly conducting. Some waxes and plastics do not develop surface conductance in the presence of water vapor and cannot be discharged in this manner.

For humidification to be effective the relative humidity should be at least 50% and preferably 50% or more. In many industrial operations such humidities are deleterious to the stock, as in the case of calendered plystock. On the other hand, humidities of 20-25% have been found to accentuate the electrification of the stock during processing. In a paper on fire hazards and static electricity in rubber factories Hoxie (3) points out that the fire hazard is greatest at the time of least humidity and three-fourths of the fires are caused by

[1] Presented before the National Technical Conference, Society of Plastics Engineers, Inc., Boston, Mass., Jan. 23, 1953.
[2] Goodyear Tire & Rubber Co., Akron 16, O.
[3] Numbers in parentheses refer to bibliography at end of article.

a deficiency in atmospheric humidity. An interesting sidelight reported by Turkington (4) is the variation in the hazard from individual operators, some of whom are "human dynamos" because of skin dryness. In one instance five shoe machine fires from rubber cement were attributed to one operator, and the difficulty was corrected by changing operators.

There are numerous references in the literature to fires and explosions caused by electrostatic sparks in the rubber (5), petroleum (6), cereal, powdered metals, and other industries. The accumulation of inflammable dust in the air carrying static electrical charges has been shown by Beyersdorfer (7) to be a direct cause of dust explosions. In the Autumn of 1948 the newspapers reported several anaesthetic-gas explosions in hospitals in the eastern section of the United States. It is generally conceded today that sparks from static electricity are the most common cause of fires or explosions of combustible anaesthetic gases and vapors. This is one of the factors against the use of ether as a general anaesthetic. Electrostatic charges may develop in the rubber tires of operating tables and operating room carriages when they are moved over the floor, or on personnel by walking and scuffing on rubber floor coverings. Pulling a sheet over a rubber covered mattress may develop an electrical charge, especially if the sheet is made of a high-dielectric plastic material, or most of the usual synthetic fabrics. To insure complete removal of the hazards of static electricity in hospital operating rooms the United States Bureau of Mines (8) recommends that all rubber goods used be of the conductive type and that the use of articles made of plastics or synthetic fibers be prohibited.

The generation of static electrical charges on transmission and conveyor belts has been analyzed by Silsbee (1) and others (9), and means of dissipating the charges are discussed. Most motorists have experienced the electrical shock resulting from the static charges developed in automobile tires. This has been studied rather extensively by Beach (10) and others (11, 12), who found that the dielectric properties of the compounding ingredients used in the rubber and the nature of the tread design are important factors. Potentials of 6,000 volts may be produced at speeds up to 35 m.p.h. (12). It is interesting to note in this connection that Butyl rubber inner tubes containing carbon black have relatively high electrical conductivity, which results in lower accumulation of static charge on vehicles thus equipped (13).

The effect of activated oxygen and ozone on rubber, due to electrostatic discharge in air, has been studied by several investigators. Cotton (14) proposed the idea that ionization of oxygen both on the surface and throughout the mass of rubber on a masticating mill, caused by static charges produced by friction, plays some part in promoting oxidation. This was confirmed by Busse (15), who concluded that the rate of oxidation is increased by the activation of oxygen during milling owing to the electrical charge which develops, resulting in the formation of a rubber peroxide. The electrostatic charges built up by the movement of an inner tube in a tire casing are discharged at the contact surface of tube and casing. Such a discharge could cause surface crazing of inner tubes, since traces of ozone might be formed, according to Sperberg (13) and coworkers.

Electrostatic Dust Collection on Plastics

Static electricity has long been a nuisance in the manufacture and use of plastics. The annoyance caused by particles of plastics adhering to grinding and shredded machinery is well known to processors. In packaging operations where thin films of plastic are employed, production may be greatly curtailed by static charges developed during printing and at the bag and packaging machines. Perhaps the greatest nuisance is the collecting of dust on plastics during use due to electrostatic deposition. In 1933 a colorful display of plastics at the World's Fair in Chicago had to be removed because of excessive dust collection. This was probably the first graphic demonstration of this phenomenon. Since then there have been numerous examples of a similar nature. During World War II the accumulation of dust on aircraft instrument dials and canopies made of plastics caused considerable trouble. Showroom and advertising displays of plastics are frequently covered with dust. Wiping the dust off with a dry cloth simply serves to create an additional electrostatic charge and increases the dust collecting ability of the article. One manufacturer of lighting fixtures recommends cleaning with a cloth saturated with trisodium phosphate solution. The film of salt thus left on the surface absorbs sufficient moisture from the air to give a thin conducting layer and reduces electrostatic dust attraction. Music lovers are familiar with the crackle and pop resulting from dust-covered plastic phonograph records and the electrostatic devices that are available for removing the dust.

A very thorough investigation of the mechanism of electrostatic dust collection on polystyrene wall tile has been made by Woodland and Ziegler (16). By blending red and green fluorescent pigments of opposite polarity and allowing these to collect on polystyrene wall tile by electrostatic attraction, these investigators obtained striking "black light" colored photographs which showed the presence of positive and negative charges side by side in finely divided patterns. They found that areas having static charges of a relatively mild nature are almost sure to collect dust in some form; whereas very strong positive and negative charges existing in close proximity are sure to have unusual and well-patterned dust deposits. Using a similar technique, Hull (17) showed how electrostatic charges are distributed on materials such as paper. Paper from heat-set printing presses showed streaks of static electricity generated by idling rollers and shifting patterns generated at the folder, often with opposite charges on the same sheet. The polarity of the electrostatic charges on raw rubber, gutta percha, soft vulcanized rubber, and ebonite has been studied by Shaw (18) and Deodhar (19), who also reported the simultaneous presence of both positive and negative charges.

Anti-Static Agents

Many references are contained in the technical and patent literature to anti-static agents for preventing or dissipating electrostatic charges in plastics. With the exception of the radioactive types, which function by ionization, most of these materials are hydroscopic and absorb moisture from the atmosphere to form a conducting layer. Graham (20) has studied the factors involved in the reduction of static charges on nylon fibers by means of anti-static agents and found a peculiar periodicity in the per cent. treating agent-voltage curves, often with a reversal of sign of the electrical charge.

Electrostatic Precipitation of Atmospheric Dust

The principle of flocculation of smoke in an electrical field was discovered by Holfeld (21) in 1824. It remained for Cottrell (22) to make the first practical application of this principle in precipitating industrial fumes. In 1931, Penney[4] developed a means of reducing the cost

[4] Gaylord W. Penney, professor, electrical engineering, Carnegie Institute of Technology, Pittsburgh, Pa.

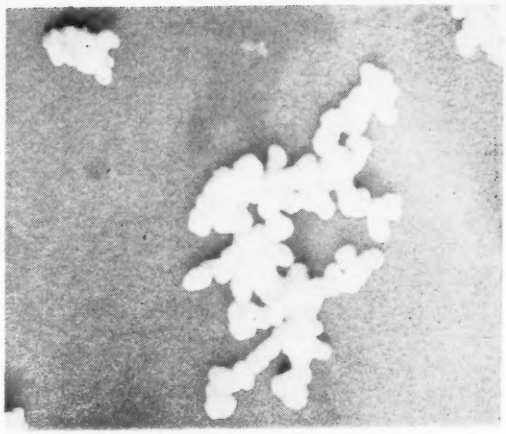

Fig. 1. Electron Micrograph of Smoke Particles in Air Filter Tests; the Carbon Spheres Are 0.05-Micron in Diameter

and the size of the equipment and made other improvements so that it could be used to clean air in ventilating systems. In the electrostatic precipitators now used for the removal of dust from the air, all particles are electrically charged as they pass through a high voltage ionizer and are then attracted and adhere to collecting plates which carry an opposite charge. These units are highly efficient in removing even the finest sub-microscopic dust and smoke particles from the air, but they are also somewhat expensive for use in ordinary home heating and ventilating systems.

The question thus presented itself: could not the electrostatic dust collecting ability of certain high-dielectric plastics be utilized in air filters? The evidence seemed to indicate that in the generation of "frictional" or static electricity the bodies involved must be solid or liquid (1). The passage of a gas over a solid or liquid surface had not been found to produce any electrification unless dust particles or droplets were present. As Turkington (4) pointed out, static generated by discharge of carbon dioxide from cylinders is negligible unless solid particles are mixed with the gas. Thus when the cylinders were in an upright position no sparks resulted, but when the cylinders were inverted, sparks up to three inches long were obtained.

We found that the initial residual charges on the surface of plastics were enhanced by the passage of air currents, and potentials as high as 1,200 volts were obtained on certain plastics at an air velocity of 300 feet per minute. Since air filters embodying the use of such materials would not require a source of electrical energy in order to function as electrostatic precipitators of atmospheric dusts, they would be relatively inexpensive and properly considered as self-charging. Before discussing the practical aspects of such filters let us consider the nature of atmospheric dust and smoke.

The Nature of Atmospheric Dust and Smoke

When dust is blown about by the wind, it becomes electrically charged. This phenomenon was studied by Rudge (23) who deduced four generalizations: nonmetallic elements give positively charged clouds when the finely divided solid material is blown by a current of air; metallic elements give negatively charged clouds under the same conditions; acid-forming oxides give positively charged clouds; and basic oxides give negatively charged clouds. In the case of salts the charge apparently depends on the relative strength of adsorption of positive and negative ions.

The carbonaceous smoke particles present in a normal city atmosphere stay dispersed for long periods of time and are carried long distances by the normal movement of the air because of their small particle size, low apparent density, and the electrical charges which they carry. In general, smokes are characterized by particle sizes below 0.5-micron. Some of the particles may be positively charged, and others negatively, depending upon the material of which they are composed and also on the manner of formation (23, 24). Electrical flocculation experiments conducted by Lodge (25) on a cloud of smoke showed that in ordinary smokes about 30% of the particles are charged sufficiently to flocculate under the influence of a high-voltage alternating current.

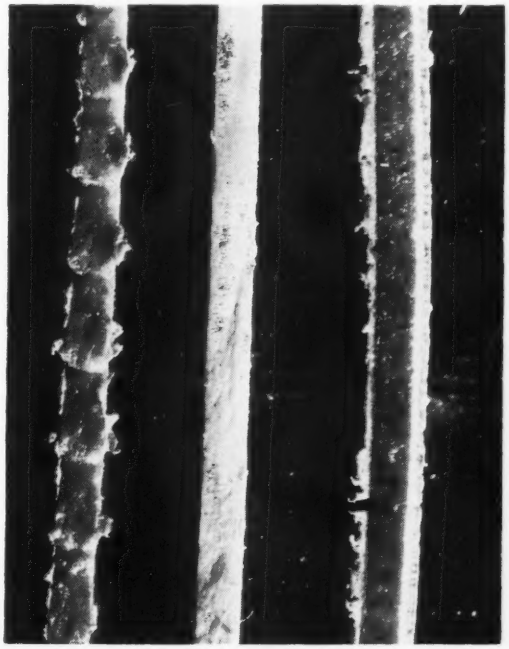

Fig. 2. Electrostatic Air Filter Elements Showing (*Left*) Serrated, (*Center*) Smooth, and (*Right*) Fuzzy Edges

Electrical charges in aerosols may be produced by friction of the particles rubbing together, by friction with the air, or by the action of an ionizing agent such as ultra-violet rays, ionic discharge from high-tension wires, or atmospheric disturbances. Because of these factors such particles are difficult to remove from the air by conventional filtration processes without employing a medium with undesirable air flow resistance characteristics at the velocities normally required in heating and ventilating systems. Furthermore, the amount of power required to force air through a filter with sufficiently small pore size to remove highly dispersed smoke is greatly in excess of that normally available in such systems.

It is the finely divided carbon present in the air in the form of smoke and soot that is responsible for most of the soiling of walls and furnishings in homes, offices, stores, and other buildings. These highly dispersed and electrically charged particles become deposited on such surfaces by thermal or electrostatic precipitation (26), causing a great economic loss in cleaning and redecorating expense.

A study of atmospheric dust concentration in 14 American cities made by the U. S. Public Health Service in 1936 showed that the average amount of suspended matter in the air during the winter months was 5.1 milligrams per 10 cubic meters, or 815 particles per

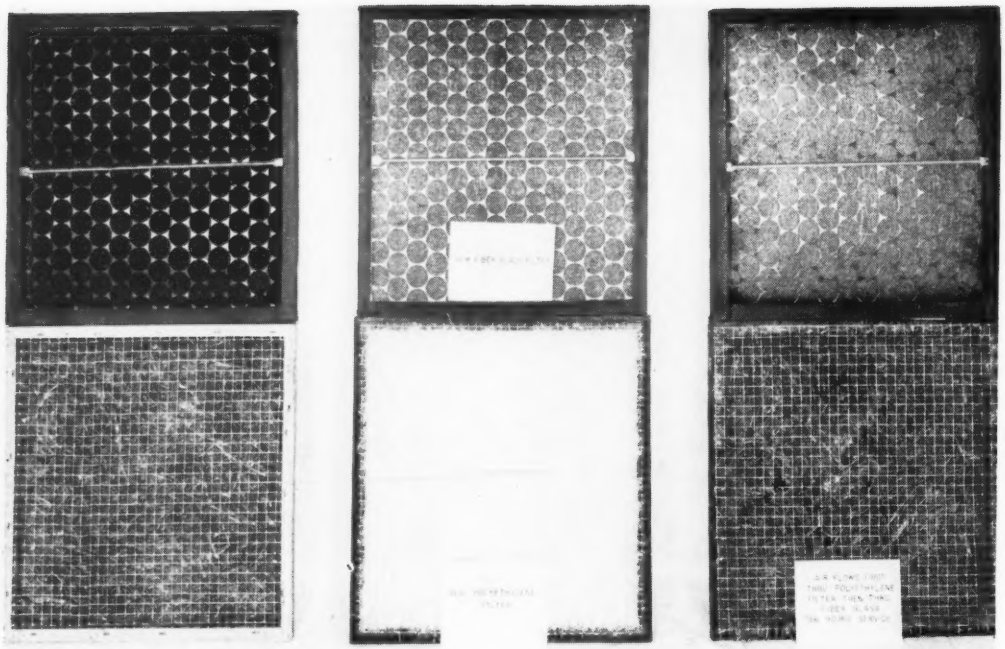

Fig. 3. Comparative Dust Collecting Abilities of Conventional Glass Fiber Impingement-Type Air Filters with Shredded Polyethylene Self-Charging Electrostatic Filters

cubic centimeter, of which 65% consisted of carbonaceous matter, 35% ash, including 12% silica and 2% iron oxide. The median size of the dust particles was found to be 0.58-micron, and only a small percentage of the particles was more than 1.5 microns in diameter. The variation in particle size from city to city was found to be very small.

Self-Charging Electrostatic Air Filters

The materials listed in Table 1 have been observed to generate an electrostatic charge under the influence of an air stream and collect dust from the atmosphere by electrostatic attraction to a greater or lesser degree.

TABLE 1. MATERIALS CAPABLE OF COLLECTING DUST FROM THE ATMOSPHERE BY ELECTROSTATIC ATTRACTION

Rubber hydrochloride	Regenerated cellulose
Cyclized rubber	Polyamide resins
Chlorinated rubber	Polyethylene
Polyisobutylene	Polystyrene
Polyacrylonitrile	Fluorinated ethylene polymers
Vinyl chloride polymers and copolymers	Methyl methacrylate
Waxes	Ethyl cellulose
Vinylidene chloride polymers and copolymers	Melamine resins
Cellulose nitrate	Urea resins
Acetate	Phenolic resins
	Natural resins

Among the materials found to exhibit this phenomenon are those which can be formed into thin films by calendering, extrusion, or casting from solution and then shredded to form a porous mass. They can also be extruded and drawn into filaments or fibers similar in size and shape to the glass fibers employed in air filters. Materials which cannot be readily obtained in film or fiber form, such as some of the plastics and the various waxes and resins, can be coated from solution or dispersion on a porous or fibrous material, such as glass, vegetable or animal fibers, and shredded paper, to impart electrostatic properties to the type of filter masses presently employed in air filters.

The plastics most suitable for use in electrostatic air filters develop both positively and negatively charged areas in the same mass and will, therefore, attract and retain both types of charged particles. As some dust particles carry a negative charge, and others are positively charged, the possibility of using two electrostats of opposite average polarity in an air filter was considered. It was found that polystyrene and Pliofilm carry an opposite balance of charges, which point can be demonstrated by bringing charged streamers of these two materials within their spheres of influence. Under these conditions they are mutually attractive, showing that they are of opposite sign. A filter constructed of layers of these two materials, however, was no more effective than one made of polyethylene alone.

Some plastics will collect dust even under conditions of high humidity (16). According to Von Heppel, the surface resistivity of polystyrene does not decrease with increase in relative humidity, and polyethylene shows only a slight decrease. The insensitivity of the electrostatic properties of polystyrene to moisture has been demonstrated by Woodland and Ziegler (16), and also by Weber and Flammersfeld (27).

Air filtration efficiency tests conducted in our laboratory showed humidity to have no significant effect on polyethylene. It was found, however, that dielectric materials which contain polar groups, such as rubber chloride and hydrochloride, and cellulose acetate and nitrate, tend to be sensitive to high atmospheric humidity and either do not build up a sufficient electrostatic charge, or the charge developed is rapidly dissipated. The net result is that such materials are not effective electrostatic dust precipitators under conditions of high humidity.

Radio-active materials such as polonium and uranium, which emit rays that ionize the atmosphere and produce electromagnetic effects, will discharge the electrostatic filters and render them ineffective.

The evaluation of air filter efficiency by means of atmospheric dust is a rather slow process, and an accelerated test was desired in order to evaluate the various electrostatic plastics as practical dust collectors. It was found that an aerosol of fine smoke could be generated

by burning a mixture of alcohol and benzene under controlled conditions (Figure 1). Using this as a source of smoke, filtration tests were conducted on various electrostatic materials at 300 fpm. air velocity. Some results of these tests are shown in Table 2.

TABLE 2. LABORATORY SMOKE FILTRATION TESTS

Material	Gram of Smoke Retained per 20 Grams Fuel Burned
Oil coated glass fibers (control, not electrostatic)	0.065
Polyethylene—shredded film	0.261
Coated on glass fibers	0.348
Shredded film coated with glycerine	0.047
Polystyrene—coated on glass fibers from latex, then fused	0.335
Coated on glass fibers from solution	0.226
Polyamide fibers	0.213
Polyvinylidene chloride shredded film	0.079
Polyvinyl chloride shredded film	0.044
Rubber hydrochloride shredded film	0.047

The oil-coated glass-fiber material used in these tests was from a standard commercial impingement filter, the type most commonly used in heating, ventilating, and air conditioning systems. The effect of surface area on the smoke collecting efficiency of polyethylene will be noted by comparing the shredded film with the coated glass fibers. Coating the shredded material with glycerine dissipates the electrostatic charge and reduces its efficiency to the level of an impingement filter. The low smoke collecting efficiency of polyvinylidene chloride, polyvinyl chloride, and rubber hydrochloride is believed due to the polar nature of these plastics, which reduces the amount of electrostatic charge developed under the humidity conditions of the test.

In addition to surface area, the nature of the surface is a factor in determining the dust and smoke collecting efficiency of electrostatic materials. Serrated or fuzzy edges, as shown in Figure 2, serve as centers of attraction and are much more effective than smooth surfaces.

A comparison of the dust collecting abilities of conventional glass fiber impingement-type air filters with self-charging electrostatic filters made of shredded polyethylene is shown in Figure 3. The upper set of filters is of glass fiber; while the lower set is of polyethylene. The center panel shows the unused filters. In the left-hand panel, the dusty air was sent first through the glass filter (*top*) and then through the plastic filter (*bottom*), while in the right-hand panel the positions of the filters were reversed. It can be seen that the polyethylene filter, when used first (*see bottom right*), removed the dust; while the glass fiber filter, when used first (*see top left*), was not particularly effective, as judged by the condition of the plastic filter (*bottom left*).

Not only are these electrostatic materials effective in attracting and retaining fine particles of dust and smoke, but they have also been found to be effective at the other end of the dust spectrum. Practical tests have shown that filters made of polyethylene in suitable form will remove wind-borne particles of sand and pollen grains 25 microns and larger in size. This has been demonstrated in tests on railroad Diesel locomotives and car air conditioning systems and also in the homes of people suffering from dust allergies (28).

Thus the inherent electrostatic properties of some plastics, which are normally considered undesirable and may be a hazard, can be employed for a useful purpose if properly applied.

The authors wish to thank Joyce Bates and Leora Straka, of the Goodyear research library, for their assistance in searching the literature for references used in this paper.

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Meetings and Reports

SPI Thermoplastic Structures Division

THE completion of its first year of existence has been marked by the Thermoplastic Structures Division of the Society of the Plastics Industry, Inc., 67 W. 44th St., New York 36, N. Y. Concerned with rigid structures based on polyvinyl chloride and polyethylene plastics, the Division is working to increase the product applications for these materials by the establishment of quality standards, definitions of terms, welding procedures, and methods of testing rigid sheets. Welding and chemical test methods already have been tentatively accepted by the member companies.

Raymond B. Seymour, Atlas Mineral Products Co., is chairman of the Division, and the following committees and chairmen have been set up: definitions, Willard Crater, Naugatuck Chemical Division, United States Rubber Co.; welding techniques, George Laaff, Bolta Co.; PVC test methods, Lee Kuhn, Firestone Plastics Co.; polyethylene, Alex Neumann, American Agile Corp.; and education, C. E. Heil, Heil Process Equipment Corp. These committee chairmen and Mr. Seymour also comprise the executive and membership committees.

Membership in the Division presently consists of 24 firms. As for the field of rigid thermoplastics in this country, there are six firms producing rigid vinyl resins, two making polyethylene resins, and approximately 25 fabricating sheets and structural products from these plastics.

Plastic Pipe Growth

The plastic pipe industry has experienced a phenomenal growth during the past five years, according to Bert S. Montell, Society of the Plastics Industry, Inc., speaking at the fifth annual meeting of the National Water Well Association on October 27 at Philadelphia, Pa. Total industry sales in 1948 approximated $500,000, but reached a $15,000,000 market in 1952. Conservative estimates by extruders and material suppliers indicate that plastic pipe sales in 1953 will approach $30,000,000, and that a $250,000,000 market will be attained by 1957. Plastic pipe is a practical reality today, Mr. Montell said, and is fully able to stand on its own merits as the most suitable and effective material for numerous pipe applications.

SPE Sections Meet

Decorative Techniques

THE New York Section, Society of Plastics Engineers, was host to the Newark Section at a joint dinner-meeting on November 18 at the Gotham Hotel, New York, N. Y. Approximately 135 members and guests heard a talk on "Decorative Treatments for Polystyrene" by Ralph E. Hammer, Monsanto Chemical Co. Next came a showing of the Tennessee Eastman Co. color film on the use of Tenite plastic in Australia, particularly in water pipe.

Mr. Hammer gave an interesting discussion of decorating techniques and applications, using many slides to illustrate his talk. Among the topics covered were lacquering, including lacquer requirements, plastic surface conditions, lacquering methods, and advantages of the process; metallization of plastics by means of electroplating, spraying, vacuum metallizing, and cathode sputtering; printing and stamping methods, including silk screening, hot stamping, dome and offset printing, rubber stamping, and decalcomanias; and destaticization treatments.

New York Section President Saul Blitz, Tico Plastics, Inc., presided over the meeting and introduced the Newark Section officers present. An invitation was extended by the Newark Section to attend a joint dinner-meeting on January 13, 1954, at Newark, following the custom of recent years.

Table favors were distributed through the courtesy of Empire Brushes, Inc.; Ferro Chemical Corp.; Monsanto; and Naugatuck Chemical Division, United States Rubber Co.; and the meeting included a drawing for door prizes contributed by American Molding Powder & Chemical Corp.; Dusal Tool & Mold Co.; H. Kohnstamm & Co., Inc.; Naugatuck Chemical; and Robinson Plastics Corp.

Beryllium Copper Molds

A talk by Joe Healey, Manco Products, Inc., on beryllium copper molds highlighted the October 20 dinner-meeting of the Ontario Section, SPE, held at the St. Regis Hotel, Toronto, Ont., Canada. Speaking on the topic, "Not Cheap Molds, but a Means of Attaining the Designs Being Formulated to Further the Sales of Plastics," Mr. Healey gave a detailed discussion of the methods of manufacturing and handling and applications of beryllium copper pressure-cast molds. Emphasis was placed on the fact that beryllium copper is not a replacement material for steel molds, but is rather an auxiliary material for molds with intricate cavities which would be too expensive to make in steel. When a mold can be cold hobbed from steel with a minimum of hob failure, beryllium copper should not be used unless its thermal properties in the specific application are such as to overweigh the added cost involved, the speaker declared.

Panel Discusses Mold Making

A new record attendance of more than 190 members and guests was present at the October 21 joint dinner-meeting of the SPE Chicago Section and the SPI Midwest Chapter, held at the Western Society of Engineers Bldg., Chicago, Ill. The technical session consisted of a panel discussion of "Mold Making," with John Press, Federal Tool Co., as moderator. The panel members were Ray Phillips, Chicago Molded Products Co.; R. O. Schulz, R. O. Schulz & Co.; J. Atols, Atols & Son Tool & Die Works; and John Andras, Major Tool & Die Co.

Mr. Phillips spoke on the time required to design and build molds for large plastic parts. Although all customers think that molds take too long to build, a certain minimum elapsed time is necessary even under ideal circumstances; for example, it takes at least six weeks to get the forgings for a large mold. This time can be used for checking the mold drawings and making desirable changes in design.

Mr. Schulz discussed handling and fabrication problems in the production of large molds. Since these molds may weigh from 2-8 tons, they must be moved by overhead cranes. Proper-size eye bolts and chains must be used for this purpose, and it is important to avoid overloading the crane. While large molds require greater amounts of machining and other work, they provide little more space in which to do this work, and it is rare that more than two men can work on the mold at the same time.

The heaviness of large molds also creates a problem in that they can be handled by relatively few mold making machines. Certain types of complicated machining can be avoided sometimes by the use of inserts. The often unpredictable dimensional changes of the steel molds during heat treating operations may necessitate grinding down surfaces that, on large molds, require a long time.

Mr. Atols spoke on mold cost estimating, noting that the mold maker suffers when costs are not estimated correctly. When molds were small, this problem was not acute, but with large molds an incorrect estimate may mean bankruptcy for the mold maker. It is of utmost importance that the mold maker work in close collaboration with the designer of the part and the molding engineer in order to prevent excessive mold costs and the need of mold design changes after mold construction has begun. Factors that should be considered in making up a cost estimate include type of mold, type of plastic to be used, the mold steel, the hardening and core requirements for the mold, the finish on the mold cavity and core, and the sizes of the major mold blocks and components. The time required for each mold making operation must be considered, and allowance made for anticipated delays.

Mr. Andras summarized the problems of mold making, particularly those peculiar to large molds. Special mention was made of the fact that the time needed for manufacture increases out of proportion to increase in mold size. In addition, large molds require a higher degree of skill by the mold maker.

CALENDAR

Jan.	18-22.	American Institute of Electrical Engineers. Winter General Meeting. Hotel Statler, New York, N. Y.
Jan.	22.	Philadelphia Rubber Group. Poor Richard Club, Philadelphia, Pa.
Jan.	25-28.	Plant Maintenance & Engineering Show. International Amphitheatre, Chicago, Ill. Conference at Hotel Conrad Hilton, Chicago.
Jan.	27-29.	Society of Plastics Engineers. Tenth Annual Technical Conference. Royal York Hotel, Toronto, Ont., Canada.
Jan.	29.	Akron Rubber Group. Panel Meeting. Mayflower Hotel, Akron, O.
Feb.	2.	The Los Angeles Rubber Group, Inc. Hotel Statler, Los Angeles, Calif.
Feb.	4.	Northern California Rubber Group.
Feb.	10.	Newark Section, SPE. Military Park Hotel, Newark, N. J.
Feb.	17.	New York Section, SPE. Hotel Gotham, New York, N. Y. Washington Rubber Group.
Mar.	2.	The Los Angeles Rubber Group, Inc. Hotel Statler, Los Angeles, Calif.
Mar.	4.	Northern California Rubber Group.
Mar.	10.	Newark Section, SPE. Military Park Hotel, Newark, N. J.
Mar.	17.	New York Section, SPE. Hotel Gotham, New York, N. Y. Washington Rubber Group.
Mar.	18-20.	Division of High Polymer Physics, APS. Detroit and Ann Arbor, Mich.
Mar.	22-24.	Committees D-9 and D-20, ASTM. Roanoke Hotel, Roanoke, Va.
Mar.	26.	Boston Rubber Group. Spring Meeting.

Armstrong Reports on European Trip

The monthly meeting of the Northern Indiana Section, SPE, was held November 13 at the Van Orman Hotel, Fort Wayne, Ind. The social activities consisted of a smorgasboard dinner to which the ladies were invited and the awarding of the door prize, a set of melamine dishes.

The address of the evening was delivered by C. W. Armstrong, Armstrong Products, Inc. Mr. Armstrong, having recently returned from Europe, discussed plastic developments in that area. He also showed slides of the various places visited and described to the 55 persons present the buying habits of Europeans.

Polyethylene Price Drop

THE third price reduction in less than 14 months for polyethylene resins and compounds was announced by Bakelite Co., New York, N. Y. The cost per pound of the material is now set at 41¢.

The current short supply of polyethylene is expected to be relieved shortly after production begins at two of the company's three new plants. The combined output of the two facilities will approximate 120,000,000 pounds a year, or about 85% of the current annual total industry production of this material.

Scientific and Technical Activities

Astin Discusses Tire Testing

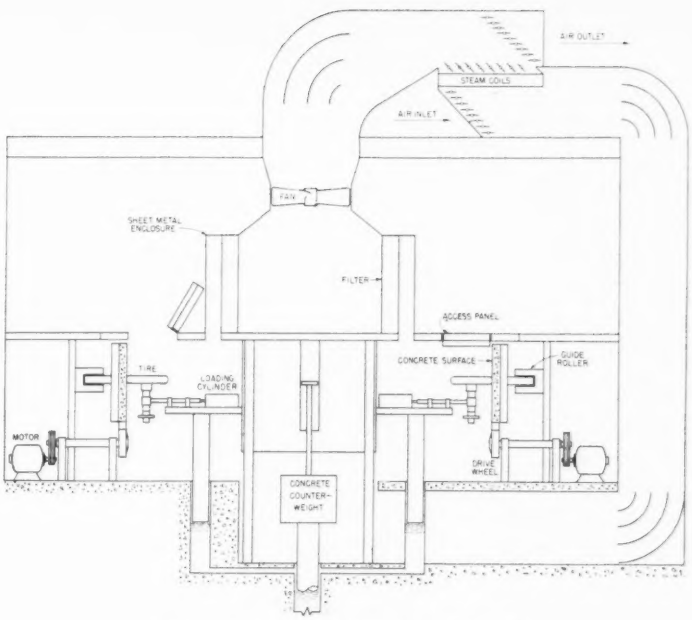
A TALK on "Tire Testing by the Federal Government," by A. V. Astin, director of the National Bureau of Standards, highlighted the October 28 annual dinner-meeting of the Akron Council of Engineering & Scientific Societies, held at the Mayflower Hotel, Akron, O. More than 500 members and guests attended the meeting, preceded by a social hour sponsored by local machinery and chemical suppliers. D. F. Behney, Harwick Standard Chemical Co., was banquet chairman; H. H. Waters, Firestone Tire & Rubber Co., acted as toastmaster, and the speaker was introduced by Robert Mayne, Goodyear Aircraft Corp.

Dr. Astin stated that conservative estimates indicate that a tire procurement program based on specifications recently developed by the Bureau would save the government about $5,000,000 annually. While tread wear is generally recognized as the major factor in determining tire life, a direct specification for tread wear has not consistently been a factor in government procurement of tires. In the absence of an effective means for buying tires on a performance basis, the government has frequently acquired tires of poor quality, the speaker declared.

About four years ago the General Services Administration asked NBS for assistance in developing a realistic performance specification for tires. The major difficulty in preparing such a specification has been the absence of simple and reliable methods for measuring tread life, with consequent recourse to road tests. Dr. Astin noted that road test results are affected by the nature of the road surface, curvature of the road, wheel position, speed, load, and operating temperature. Work at Washington State College has shown a variation of more than 10:1 in the tread wearing rates on the best and poorest roads in the test. Reports from England indicate a tread life of 10,000-15,000 miles on its roads for tires produced in this country where mileages two to three times these values are not uncommon. Dr. Astin pointed out that, in addition to improvements in manufacture, the increase in tire mileage over the past 30 years must be attributed also to improved roads in this country.

The Bureau's work on the problem has been in two areas, Dr. Astin said: (1) the introduction of modern statistical techniques to provide maximum reliability of data with minimum number of tests; and (2) the development and refinement of weight-loss techniques for tread-wear measurement. With these techniques it is possible to obtain consistent estimates of tread life with an accuracy of about 10-12% from tests covering not more than 5,000-6,000 miles. It is estimated that road tests for 15,000 miles would be needed to obtain equivalent precision and reliability by the tread-depth measurement method.

A specification based on this road test method was used from February, 1952, to April, 1953, when it was abandoned because of lack of funds. During this period a reduction in the spread between the best and the poorest tire specimens was noted together with an increase in the average estimated mileage from 28,000 to 39,600 miles. The method, however, required three months to complete a set of measurements. For this and other reasons, the Army Ordnance Corps asked the Bureau to develop an indoor tire tester to measure tread wear and other factors, Dr. Astin explained.



Schematic Drawing of NBS New Tire Tester

The design finally selected by NBS is based on the rotating vertical road bed and consists of a cylindrical track 1/50-mile in circumference formed from a steel I-beam about 3½ feet high and lined on the inside with 24 concrete sections three inches thick. Fastened to the bottoom of the beam is a steel rail which supports the track. This rail rests on 18 trolley wheels, of which 12 are driven by 20-hp. variable-speed motors at controlled speeds from 22-66 miles per hour. During rotation, the beam is held in position by 18 guide wheels.

The track and the platform are enclosed in a temperature controlled space. Air from the tires passes through automatic filters to remove dust and then goes to the roof of the building, where it is either discharged or recirculated. Recirculated air is heated at this point, if necessary, and then passed down a duct to the center of the test chamber. Test tires are forced against the concrete roadway by means of air cylinders, and a second set of cylinders is used to oscillate the plane of the tire one or two degrees about the plane of the track to simulate going around curves. This action causes sideslip, which is the factor primarily responsible for tread wear, Dr. Astin noted. The air cylinders and tire mounts are supported on a platform which moves slowly up and down so that the tires traverse the track. The platform is supported by six hydraulic cylinders and counterbalanced by a seventh cylinder. A high-pressure hydraulic cylinder connected to the counterbalance controls the rate of traverse.

Dust applied to the track by means of an air stream serves to prevent gumming of the track and also simulates actual road conditions. The apparatus can test 18 tires simultaneously in sizes ranging from 6.40-15 passenger size to 11.00-20 truck size. Above each tire are an observation window and an access panel for changing the tires. Automatic devices are used to retract tires which fail so that constant attendance by operating personnel is not required. Dr. Astin stated that the Bureau expected to have the equipment operating for preliminary tests by late November.

Washington Group Banquet

THE sixth annual banquet of the Washington Rubber Group was held October 19 at the Touchdown Club in Washington, D. C. Approximately 120 members, guests, and wives attended the event, which consisted of a cocktail hour, dinner, and dancing.

The only business conducted during the evening was the installation of officers for the coming year. These included: G. M. Riveire, Goodyear Tire & Rubber Co., president; P. Greer, Office of Synthetic Rubber, vice president; A. M. Anisman, OSR, secretary; Ethel Levene, Bureau of Ships, treasurer; and R. J. Fanning, American Dental Association Research Fellowship, recording secretary. In addition, Mr. Riveire announced the following committee chairmen: J. T. Cox, consultant, programs; R. H. Williams, The B. F. Goodrich Co., membership; and Miss Fanning, publicity.

Testing Service by Bush

TESTS concerning the ozone cracking of rubber can be performed by the testing section of G. F. Bush Associates, Box 175, Princeton, N. J., according to a recent announcement from the company. In requesting information, the test required should be completely specified.

Philadelphia Group Hears Processing Discussed

THE meeting of the Philadelphia Rubber Group held at the Poor Richard Club, Philadelphia, Pa., November 13, at which the subject of "Mixing and Extruding Methods and Equipment," was discussed by George L. Bruggemeier, Firestone Tire & Rubber Co., and Robert L. Wattleworth, The B. F. Goodrich Co., attracted a near-record attendance of about 170 members and guests.

George J. Wyrough, R. E. Carroll, Inc., chairman of the Group, announced at the beginning of the meeting that the next meeting would be held on January 22 at the Poor Richard Club and that W. J. Sears, vice president, The Rubber Manufacturers Association, Inc., would speak on "Future of Rubber Supplies." The chairman also announced that J. B. Johnson, Linear, Inc., had been appointed historian for the Philadelphia Group, and that in another action the executive committee had appointed Leo Dete, Carlisle Tire & Rubber Corp., to make a recommendation for some worthy project for the Group to sponsor, in view of a modest balance now available in the treasury.

Anthony DiMagio, Firestone, vice chairman of the Group and chairman of its program committee, then introduced the speakers for the meeting.

Mr. Bruggemeier first pointed out that at one time the conventional two-roll mill was the standard unit for mixing of rubber, and not until the advent of the Banbury mixer was the art of mixing improved. Whether mixing is done on the mill or in the Banbury, the rubber industry is limited to batch operations because satisfactory equipment has not been developed for the continuous mixing of rubber, although definite strides have been made in the automatic handling of rubbers and pigments.

As the result of increased emphasis on the art of automation as applied to the rubber mill room, progress has been made for the mixing phase through bulk handling systems for carbon black, by the pelletizing of both raw rubbers and mixed stocks, and by the use of automatic compounding techniques for Banbury mixing cycles. There is still a lot more development needed, but the fundamentals have been learned, and it was predicted that ultimately raw materials will be received and processed in a continuous flow with minimum labor requirements.

With the disposal of the government synthetic rubber plants to private industry, it is expected that new polymers will appear on the market which may have a marked effect on processing equipment as now used or being developed.

Of the several internal mixers on the market today the Banbury is the most universally used. Farrel-Birmingham Co., Inc., is redesigning the Banbury for improved operation, and Stewart Bolling & Co., Inc., Struthers Wells Corp., and Francis Shaw & Co., Ltd., of England, are also developing improved mixers for rubber and plastics.

Although several equipment manufacturers both in this country and abroad are working on the development of equipment for the continuous mixing, blending, and warm-up of rubber, to date none has given complete satisfaction in present plant operations, it was concluded.

Mr. Wattleworth, in his talk, first explained that his discussion of mixing and extruding methods and equipment would be from the viewpoint of the processor. He reviewed developments in mixing, which until 1940 were concerned with natural rubber mostly, but since that time have involved many synthetic rubbers. Changes and improvements in the manufacture and content of GR-S polymers plus the trend to the use of furnace-type blacks have required some changes in mixing techniques, but in general have resulted in less restrictive and more economical operation, it was said. For example, the efficiency of the mixing of a LTP GR-S tread stock with judicious selection of carbon blacks is in some cases even better, at present, than its counterpart with natural rubber.

Special precautions for the processing of neoprene, butyl, and nitrile rubber stocks and for mixtures of resins and rubbers were explained. Of special interest was the comment that the mixing of nitrile rubber and PVC resin sometimes was best accomplished by mixing the two materials as latices and then after coagulation mixing the blend of the rubber and resin in an internal mixer at a high enough temperature to flux the resin.

The Banbury mixer is the most important piece of equipment available to the rubber processor. Most recent improvements in this machine have been in the direction of higher speeds and higher pressures on the mix. Accessory equipment and the mechanization of the feeding and removal of mixed stock were discussed.

The new machines of Struthers Wells, Stewart Bolling, Adamson-United, National Rubber Machinery, and others as mentioned by Mr. Bruggemeier were also described.

Improvements in batch mixing were considered a better approach than attempts to provide continuous mixing at the present time. Suggestions were made for the improvement of the Banbury mixer, and it was said that most of the mechanical changes at present being incorporated in this machine should keep the processor busy developing accessory compounding and batch-out equipment to keep pace with the output of the improved model.

The advantages and disadvantages of pelletized rubber were discussed also, and it was suggested that the processor needs some device that will form or cut materials into pieces the size of pellets or larger and that would permit flow in an automatic weighing and feeding arrangement. The processor must be concerned with the flexibility of such a pelletizing type of machine in other than a unit designed for minimum change of compound formulation. A device that would prepare rubbers or slab stock into pieces for automatic weighing and feeding of mixing units would also answer some of the processor's problems in warming mixed stock ahead of either the tubing machines or calenders, this speaker said in conclusion.

Mount Talks on Plasticizers

A TALK by N. S. Mount, Ohio-Apex Division of Food Machinery & Chemical Corp., on "Plasticizers in Rubber and Plastics" featured the October 15 dinner-meeting of the Ontario Rubber Section, C.I.C., at Hart House, University of Toronto, Toronto, Ont., Canada.

Mr. Mount confined his talk to chemical plasticizers which are generally high boiling, light-colored, liquid or solid esters or polyesters. These plasticizers can be divided into four major classes, as follows: (1) primary plasticizers, which maintain a colloid-like dispersion or gel structure of the resin-plasticizer combination; (2) secondary plasticizers, which act as extenders for the primary plasticizer, but may also impart some desirable property; (3) extenders, which are soluble in the primary plasticizer and insoluble in the resin and are used for economic reasons; and (4) reactive or convertible plasticizers, which have properties similar to monomeric plasticizers, but, on curing, have properties similar to polymeric plasticizers. This fourth group can be considered at present as desirable, but not available.

After discussing the structures and functions of chemical plasticizers, the speaker touched on their use in rubbers and plastics. In natural rubber chemical plasticizers are rarely used, but certain types, such as bis-dimethylbenzyl ether, give improved tack. In GR-S, adipates, sebacates, azelates, and some phosphates are used for very soft stocks requiring good low-temperature flexibility with low permanent set, and tricresyl phosphate has been used to increase flame resistance and decrease water permeability.

Nitrile rubbers are generally compounded with chemical plasticizers; the most commonly used are tributoxyethyl phosphate, Plasticizer SC, and certain adipates and sebacates for low-temperature flexibility; dibutyl phthalate for general formulations; dioctyl phthalate, n-octyl decyl adipate, and tricresyl phosphate for special applications; and bis-dimethylbenzyl ether for improved building tack of aged uncured stocks. Butyl rubber is not generally plasticized, but is usually compounded in the same manner as natural rubber, Mr. Mount declared.

Use of chemical plasticizers in polysulfide rubbers greatly reduces their natural resistance to solvents, oils, fuels, and ozone. Where necessary, butyl carbitol formal, dibutyl carbitol adipate, and dimethyl carbitol adipate are used for softening stocks; the latter two also improve low-temperature flexibility. In neoprene, certain fatty acid plasticizers have been found to give good low-temperature properties. Of these, butyl oleate, octyl fatty acid esters, and butoxyethyl stearate are commonly used. Tricresyl phosphate is used for high-temperature requirements in neoprene.

Pliofilm rubber hydrochloride uses chemical plasticizers having a low order of toxicity, since most applications are for wrapping and packaging foodstuffs. Chlorinated rubber generally employs fatty acid plasticizers, such as certain ricinoleates, oleates, and stearates. In conclusion, the speaker expressed the belief that the so-called internally plasticized resins will never replace externally plasticized resins, such as the vinyls, in many applications or seriously impede their growth.

Carbon Black Symposium

THE next event in the planned program of progressive education of the members of the Akron Rubber Group will consist of a panel discussion on carbon blacks. The symposium, to be held in the Mayflower Hotel, January 29, will be followed by a social hour, dinner, and after-dinner entertainment.

The panel will have as moderator R. P. Dinsmore, Goodyear Tire & Rubber Co., and will consist of the following members: F. H. Amon, Godfrey L. Cabot, Inc.; C. A. Carlton, J. M. Huber Corp.; L. Carver, Witco Chemical Co.; I. Drogin, United Carbon Co.; G. C. Maassen, R. T. Vanderbilt Co.; J. W. Snyder, Binney & Smith Co.; L. Sperberg, Sid Richardson, Carbon Co.; and M. Studebaker, Phillips Chemical Co.

Natural Rubber and Latex Topics at Rhode Island Meeting

THE fall meeting of the Rhode Island Rubber Club on November 19 featured two talks: "Modern Plantation Methods in Production of Natural Rubber Latex," by Chester E. Rhines, United States Rubber Co., and "Progress Report on Natural Rubber Quality Program of Rubber Manufacturers Association," by W. J. Sears, RMA. Approximately 180 members and guests attended the meeting, held at the Metacomet Golf Club, East Providence, and included a dinner and business session at which officers for the coming year were elected.

Dr. Rhines began by emphasizing the importance of technical aid in latex and crude rubber development. Although the formation of latex within the *Hevea* tree is still not well understood, its production by the tree requires five to seven years after initial planting. Important developments in tree cultivation have been the budding of clonal stock, the selection of clones for latex, and Grantham's work on nitrogen fertilizers. Some of the recent developments include a fundamental knowledge of nutrition; hormone stimulation of trees to increase yields by 30-100%; hedge planting; and Marcotting procedures to aid in the development of hardy, high-yielding stocks.

Passing on to the tapping of trees and the collection of latex, the speaker noted that this job is a skilled one, since shallow cuts give poor yields; while deep cuts scar the trees. Proper records of both the tappers and their work are needed. Proper preservation of the latex is an important step, since freshly tapped latex contains 10,000-50,000 bacteria per cubic centimeter, and this figure multiplies rapidly. Besides stopping the action of bacteria and enzymes, a preservative also should stabilize the latex and prevent any objectionable chemical changes. The most important preservative is a 2% aqueous solution of ammonia, although the formaldehyde-ammonia process has gained in usage. Santobrite has excellent preservative qualities, the speaker said, but is toxic, discoloring, and odorous and has not been accepted despite much investigation.

Dr. Rhines emphasized the need of cleanliness and sanitation in latex producing plant, saying that a rigorous code of equipment cleaning and sterilizing must be carried out from collecting station to manufacturer. Paraffin-coated steel tanks are generally used for latex, and copper equipment is avoided.

In discussing types of latex, the speaker pointed out that both normal latex and evaporated concentrated latex are almost obsolete in modern usage. Creamed latex, made by the action of a mucilagenous organic agent which causes separation of the latex into high and low solids layers, is widely used. This product provides high total solids (68%) and high purification constant at relatively low cost. Centrifuged latex (62-63% total solids) is a large-particle product that is costly, but is in demand for special uses. After discussing the importance of control tests in latex production, the speaker concluded with a brief description of the new low ammonia latex which is undergoing large-scale testing. This product has reduced odor, largely eliminates troublesome ammonia reduction problems, has uniform stability value throughout storage life, and contains a non-toxic preservative.

Mr. Sears pointed out that natural rubber quality to the buyer means that the delivery, as determined by visual inspection, conforms to the type-description and type-sample of the grade purchased. In 1951 the RMA found that 41.6% of all rubber imported was off-grade. In 1952 this percentage was reduced to 34.6% and was only 28% during the last half of the year. Most of this difficulty was with thin brown crepe and amber crepe, since for the other grades at least 90% of imports was either on grade or no more than one-quarter grade off.

The Rubber Manufacturers Association has established a working liaison with the ASTM Crude Rubber Committee on technical problems, and its quality committee meets jointly with the Crude Rubber Committe formed this year by the Rubber Trade Association of New York. It was proposed that a privately sponsored meeting of rubber producers, marketers, and importers be held in New York to consider the subject of rubber grading and packing. Packing and shipping organizations have asked that this meeting be held in Singapore, but, since New York is the chief port for receiving and inspecting rubber, the RMA and RTA committees believe the meeting should be held here. This proposed meeting is still under discussion.

Problems of grading, packing, and marketing are also discussed by the Packing & Marketing Committee formed by the International Rubber Study Group in 1950. This group has been used to gain more widespread acceptance of RMA rubber type-descriptions, type-samples, and packing specifications, the speaker said. Seven new rubber grades, to supplement existing RMA types, are expected to be initiated by Singapore dealers. These new grades will probably sell at discounts from the high-quality RMA types, but should eliminate many of the current arguments on type classification of shipments and also enable the Malayan Rubber Export Registration Board to do a better job of policing shipments.

The growing acceptance of RMA type-designations is exemplified by the fact that 440 type-samples were distributed during the past year, Mr. Sears said. In addition, enthusiastic support has been received from rubber goods manufacturers in France, Germany, Japan, and the United Kingdom. To keep the problem of quality alive, the RMA has published the proceedings of its Quality Seminars and has instituted a new publication, "Rubber Quality Bulletin."

In discussing the international political implications of the crude rubber market picture, Mr. Sears noted that although there has been no agreement on the international buffer stock plan, producing countries are seriously disturbed about the low level of natural rubber prices. While an increase in GR-S price and/or in government stockpiles of natural rubber is not believed likely, the speaker foresaw the revoking of the directive requiring a mandatory consumption of 450,000 long tons of GR-S per year and also said that a revision of the stockpile rotation program is likely.

As for the supply picture, Mr. Sears said that every estimate of future rubber consumption for the United States and the rest of the world indicates a substantial increase in the future. Currently, the United States is consuming natural rubber at the rate of about 45% of total new rubber, and this rate of use will permit a moderate surplus of natural rubber production over consumption for the next two or three years. By 1955 world production and consumption of natural rubber could be balanced by 47% use in the United States, where synthetic rubber would be used to meet other requirements. If the industry is kept well informed, plans intelligently, and buys carefully, this forecast might prove to be reliable, the speaker concluded.

The new officers of the Club elected at the business session follow: chairman, F. W. Burger, Kleistone Rubber Co.; vice chairman, Urbain J. H. Malo, Crescent Co., Inc.; and secretary-treasurer, Raymond Szulik, Acushnet Process Co. Newly elected to the board of directors were Gilbert Enser, Collyer Insulated Wire Co.; Kenneth Priestley, U. S. Rubber; H. W. Day, E. I. du Pont de Nemours & Co., Inc.; Harry Ebert, Firestone Tire & Rubber Co.; and Walter Blecharczyk, Davol Rubber Co. A feature of the session was the presentation of a gift to the outgoing chairman, Roy G. Volkman, U. S. Rubber.

Talk on Carbon Black

THE Buffalo Rubber Group held a technical and dinner-meeting at the Hotel Westbrook, Buffalo, N. Y., October 6. The gathering, which numbered some 60 persons, heard an address by M. Studebaker, Phillips Chemical Co., on "Carbon Black" at the technical session, and an after-dinner talk by K. E. Smalley, of M & T Bank, on "Residential Mortgage Financing and Interest."

Mr. Studebaker first summarized present knowledge on the physico-chemical properties of various types of carbon black. Then, from a colloid chemist's viewpoint, he dealt with the effects of carbon blacks on the properties of both unvulcanized and vulcanized rubber stocks, using slides to supplement the lecture.

Latex Film Formation

APPROXIMATELY 75 members and guests of the Elastomer & Plastics Group, Northeastern Section, A. C. S., attended a meeting on November 17 at Massachusetts Institute of Technology, Cambridge, Mass., and heard Robert H. Lalk, Dow Chemical Co., speak on "The Mechanism of Film Formation from Synthetic Latices."

Mr. Lalk built his talk around a motion picture, produced by Dow, showing the colloidal particles of a non-fusing latex undergoing drying. The pictures showed the build-up of a line of particles near the liquid edge, with larger particles becoming stranded in the shallows, and the finer particles streaming between these "islands" to fill in the film front beyond in regular hexagonal patterns. As the water evaporated further, the edges of the film consolidated and pulled together, leaving occasional voids. Electron-microscope photographs of fused compounded films from other latices demonstrated the binding action of the colloidal particles when dry, and the importance of filler-latex ratio in securing optimum film quality.

The speaker pointed out that a fusible film of particles having an average diameter of 0.2-micron flowed together because there is a tension in the range of 500 psi. between the particles during drying. Similarly, film particles having an average diameter of 0.05-micron develop a tension of 1,500 psi. during drying. Electron-microscope photographs indicate that about 15% plasticizer content is needed to secure a continuous film from a normally non-fusing latex by reducing the particles' resistance

(*Continued on page 414*)

NEWS of the MONTH

The communiqué issued at the end of the meeting of the management committee of the International Rubber Study Group held in London in October recommended that the United States increase the price of GR-S, modify its practices in natural rubber stockpile rotation, and revoke the 1952 directive regarding mandatory consumption of GR-S. By the end of November action on the last two recommendations had been taken, but none was contemplated on the increase in the price of GR-S. Meanwhile, the Indonesian Government announced that it was considering sale of rubber to Red China as an outlet for its surplus rubber.

With the appointment on November 2, of Holman D. Pettibone, Chicago banker, as the third member of the Rubber Facilities Disposal Commission, the advertisement of the synthetic rubber facilities started on November 18, and the six-month period between November 25, 1953, and May 25, 1954, was designated as the period during which bids will be accepted by the Commission.

A report on 180 accelerated tax amortization applications covering rubber and rubber products expansion projects, facilities valued at $116 million, revealed that rapid tax write-off was permitted on about $54 million. The degree of achievement of the projects for tires, horizontal wire braided hose, and miscellaneous projects was also revealed.

The Rubber Manufacturers Association, Inc., revived its annual meeting of rubber manufacturers this year and at its meeting in New York, N. Y., November 17, heard Rep. Paul W. Shafer, of Michigan, warn the management representatives present against complacency in their bidding for the government synthetic rubber plants. A. L. Viles, president of the Association, saw a bright future ahead for the industry, but added that unless there is a vigorous replanting program in the natural rubber areas and a substantial expansion of synthetic rubber producing capacity, we may have a serious rubber shortage in the next decade. Other speakers at the meeting were W. James Sears and Ross R. Ormsby, Association vice presidents; and C. W. Halligan and George Flint, treasurer and secretary, respectively.

Secretary of Commerce Sinclair Weeks released on October 16 the report of the Scientist's Committee for Evaluation of the present and future functions of the National Bureau of Standards, and, on November 13, the report of another committee called the Battery Additives Committee. Secretary Weeks said he was in complete accord with the findings and recommendations of both committees, which included tribute to the vital importance of the Bureau to national strength and competence, integrity and loyalty of the Bureau's professional men.

Industry executives and a financial statistical service made optimistic statements during November regarding the outlook for the rubber industry during 1954.

Washington Report by Arthur J. Kraft

U. S. Moves to Implement Some Rubber Study Group Recommendations; Possible Indonesian Trade with Red China Studied

In its official communiqué closing a special two-week meeting in London in October, the management committee of the International Rubber Study Group called upon the United States Government to take three steps to help lift the natural rubber market from its current protracted price slump.

IRSG Recommendations

The 18-nation conference urged "action by the government of the United States to increase the price of GR-S synthetics, to re-examine its practices in stockpile rotation, and to revoke a directive issued in 1952 regarding the level at which mandatory consumption for synthetic rubber might be re-imposed."

The communiqué, made public here November 2, also had some suggestions, likewise aimed at alleviating the current pinch being felt by natural rubber producers, which were directed to member governments generally. These were acceleration of replanting programs in the natural rubber producing area and creation of new natural rubber stocks or additions to existing stocks, whether governmental or commercial. The latter, adding to stockpiles, was considered by some as a suggestion meant for the U. S., as well as other consuming countries, such as the United Kingdom.

The communiqué of the IRSG's management committee alluded also to the somewhat improved prospect of a smaller world surplus of natural rubber than had been expected a few months earlier. The committee foresees a statistical surplus of 169,000 long tons by the end of 1953, contrasted with the surplus of 193,000 long tons foreseen after the May meeting of the full Study Group in Copenhagen. The communiqué noted that the "actual surplus will be considerably less than the revised estimate because of additions during 1953 to governmental and consumers' stocks."

The communiqué also noted that the representative of the American Rubber Manufacturers Association (A. L. Viles, president, attending as an adviser to Delegate Willis Armstrong) reaffirmed that the "United States manufacturing industry representatives believed that the position set out in their communiqué issued at Copenhagen on May 15, 1953, would in fact be realized." This was an allusion to the statement issued by industry representatives at Copenhagen that American rubber goods manufacturers would buy all the natural rubber made available to them at reasonable prices, thereby eliminating the threat of any serious surplus overhanging the market at the year's end.

The specific recommendations for action by member governments of the IRSG's October communiqué, including the three aimed directly at the U. S. Government, were prompted by a general agreement at the meeting that "recent price developments were placing the natural rubber industry in a serious position at present."

The more hopeful statistical picture noted above apparently has resulted from the fact that production has fallen off from the levels anticipated in May. Consumption also has declined from what was expected at the May meeting of IRSG, but not so much as production.

U. S. Action

Within a few weeks after the communiqué was issued, the U. S. Government came through with action on two of the three recommendations tossed its way, but showed no signs of moving on the third. On November 19 the Office of Defense Mobilization revoked the April, 1952, directive requiring resumption of mandatory usage controls in the event that consumption of GR-S should fall below an annual rate of 450,000 long tons. The directive, issued by the Defense Production Administration, also required resumption of controls on Butyl if usage of that type fell below an annual rate of 60,000 tons.

This action was followed on November 23 with an announcement by the General Services Administration that it would call in its rubber industry advisory committee for a meeting the first week of December to receive industry and trade suggestions on how to modify its stockpile rotation practices so that they would no longer depress the rubber market, as had been charged. The GSA announcement, incidentally, was couched in words that seemingly implied much more help for natural rubber producers than actually is contemplated. The press release spoke of "furthering stability in the market for natural rubber" and the "need of a greater measure of stability in the rubber market." It did not mention once the word "rotation" or make any reference to the rotation program other than referring to the "government's necessary operations in the rubber market" which the advisory committee would be asked to "examine." The decision to call in the advisory committee, which hasn't met since December, 1950, was, GSA noted, "the result of a joint agreement reached by GSA, ODM, and the Department of State." The press release took note that the calling of the industry committee meant

that the U. S. Government "has recognized, in effect, a recent suggestion of the management committee of the IRSG . . ."

Background of U. S. Action

The U. S. representative at the London meeting made it amply clear both in private and in public that the price of GR-S will not be increased in the foreseeable future in order to lift the financial burden of the natural rubber growers. Actually, it is generally felt here, there's almost no chance of a boost in the price of GR-S for any reason, including easing some of the heavy financial burden on U. S. taxpayers who again will be asked to shoulder a larger federal budgetary deficit in the coming year. The U. S. position at London was expressed by the chief American delegate, Willis Armstrong, of the State Department, when he told newsmen: the price of synthetics has "no connection with the present price developments" in the natural rubber market. This was still the U. S. government's view at the time of the GSA press announcement. It can be authoritatively stated that the State Department urged GSA to make it clear in the press release that the proposed meeting would cover only stockpile rotation practices. The references to stabilizing the rubber market were all GSA's idea, not State's. At this writing, it is still too early to tell how the GSA press release will be interpreted abroad. If it is taken to imply a greater measure of relief than could result from a modification in stockpile rotation practices, there could well be some unwelcome backfire, with market repercussions undoing even the small benefit to the rubber grower that may stem from a modified rotation program.

At this writing [November 23] the meeting of the advisory committee is still a good week away; so it is too early to tell what modifications, if any, may be adopted in the rotation program. It is known, however, what changes are likely to be urged upon GSA by its advisory committee. At the time of the GSA announcement, the government already had letters from both the RMA and the Rubber Trade Association of New York charging that the present rotation program is depressing the natural rubber market and calling for reexamination. A similar letter, making the same contentions, was sent by Rep. Paul W. Shafer (Rep., Mich.) to GSA Administrator Edmund F. Mansure and ODM Director Arthur S. Flemming on November 20, only 24 hours after GSA reluctantly agreed to State Department and ODM demands for reexamination of the rotation program.

Both State and ODM asked GSA to declare a brief moratorium on rotation activities and use this interval for a thorough inspection of stockpiled rubber to determine how close the lower grades in particular are to a stage of deterioration that would require their rotation. If this sort of detailed knowledge of the condition of the lower grades (which GSA does not now have) should show that the pace of rotation could be slowed down, it is generally assumed that ODM would follow up with a directive to GSA ordering a slowdown. This would require the revocation of a February, 1952, directive, issued to GSA by the Munitions Board, which ordered GSA to replace its heavy stocks of low-grades with higher-grade rubber as quickly as possible. Since the issuance of that directive the Munitions Board has been abolished, and its functions absorbed by ODM. It was ODM—as the agency now responsible for stockpile policy—which had the letters from RMA and RTA.

This same three-stage program is likely to be recommended to GSA by its industry advisory committee. Whether GSA will accept this suggestion remains to be seen. It would not accept it when suggested by State and ODM. What emerged from the November 19 meeting of these three agencies was an agreement to put the question of whether the rotation program should be changed up to industry and trade experts. Thus, the meeting of the GSA advisory committee early in December.

The measure of relief which could reasonably be expected to result from a change in rotation practices is not great. Aside from a 60- or 90-day moratorium in which GSA would be out of the rubber market (except for rotation of a few distress lots), the ultimate result could be a slowing down from the current rate at which low-grade stocks are sold out of the stockpile and replaced with higher grades—a rate approximating 10,000 tons a month. This would probably be best appreciated by the Indonesians, who ship primarily lower-grade rubber. Except for an indirect effect on the whole rubber price structure, it would not be of much aid to the Malayan estates, which ship chiefly the higher grades that GSA buys to replace the lower grades it sells. A reduction in the total of rotation transactions, in fact, would reduce the volume of sales to GSA of the higher grades.

Indonesia Threatens Trade with Red China

It is Indonesia, rather than Malaya, however, which is causing the most concern to the State Department and to the rubber consuming industry here. Indonesian demands for a "buffer stock" stabilization scheme for natural rubber were the reason for calling the special session of the IRSG committee for London. At that meeting the "buffer stock" scheme was shelved. Rubber consumers here don't want to see it revived next spring, when IRSG again meets. Therefore they are anxious to have the U. S. do something to placate the Indonesia rubber growers. State Department concern is more immediate. Hardly had the London meeting ended when Indonesia's government announced, in a series of defiant statements aimed at the U. S., that it was ready to turn to Red China as an outlet for Indonesia's rubber surplus. Indonesia blamed U. S. rubber policies—including the present stockpile rotation practices—for pushing her to the extreme of seeking trade with the Communist country to which she, and other members of the United Nations, have agreed not to sell strategic materials, such as rubber. An Indonesian trade mission arrived in Peiping, the Red China capital, on November 11. The mission, according to an Indonesian Government official, will also try to expand trade in other commodities and is looking beyond Red China to Japan, Australia, and the Philippines. While the prospects of resuming rubber trade with China don't appear very bright, the initiative, at least, has been taken, and a lot of people here are worried about Indonesia—an infant state lacking political or economic stability—coming under the influence of Red China.

Further Comment on ODM and GSA Actions

In contrast to the GSA press release, the announcement by ODM revoking the mandatory consumption directive was a model of forthrightness. ODM pointed out that "there has been no occasion to use this directive since synthetic rubber consumption has been above the quantities specified." It didn't quite state that existence of the directive or its revocation had become an academic matter, although that conclusion would be amply justified by the present, and probable future, higher levels of synthetic rubber consumption. And, if the government should feel impelled to slap on mandatory usage controls, it wouldn't hestitate simply for lack of a prior directive.

"The existence of this directive," ODM said, "has been viewed by many natural rubber producers as a restrictive influence on the use of natural rubber in the United States." Natural rubber producers have insisted that this directive is putting a crimp in their ability to increase sales in the U. S. Whether this is so or not, they wanted it revoked, and U. S. officials assented to this request without argument.

ODM pointed out that the Rubber Act of 1948, as amended, still remains in effect, requiring that synthetic rubber production should not fall below 200,000 long tons annually for GR-S and 22,000 tons for special-purpose synthetics "because of security reasons. Except for this requirement," ODM noted, "the removal of the directive permits unrestricted competition between natural and synthetic rubber."

Returning to the rotation program, aside from the heavy volume of rotation transactions, complaints have been raised that GSA's stockpile managers are selling too far in advance and at prices under the market, thereby dominating the market. Some replacement contracts, it has been said, have been made for delivery as far off as December, 1954. If true, contracts so far in advance would be hard to justify on grounds of the necessity of preventing deterioration of the stockpile. Unless we have been misinformed, GSA is making no effort to claim that its rotation transactions are determined by the condition of various lots of stockpiled rubber. It is simply following a directive requiring it to make haste in replacing the large volume of off-grade and lower (non-stockpile) grades which it had bought during the period following Korea when it served as exclusive U. S. importer of natural rubber. The directive, in turn, stemmed from the fact that the stockpile, as constituted when the exclusive buying period ended on June 1, 1952, did not conform to schedules established for the rubber stockpile by the Munitions Board. Those schedules envisioned a stockpile made up chiefly of higher grades, with relatively small quantities of lower grade. Whether, in view of the fact that the tire industry uses large quantities of lower grades, an effort will be made to revise stockpile schedules to permit the retention of a larger proportion of lower-grade rubber is another question. So far, there's been no indication that this will be suggested.

Rubber Facilities Commission Starts Work

The rubber disposal program was officially launched November 18 with the appearance in newspapers across the nation of an advertisement inviting bid proposals on 27 government-owned synthetic rubber facilities.[1] The advertisement, authorized by the Rubber Producing Facilities Disposal Commission, set a six-month period, the minimum required by the rubber disposal law, for receiving proposals. This

[1] See p. 339.

Photos by Chase, Ltd.

Holman D. Pettibone **Leslie R. Rounds** **Everett R. Cook**

period runs from November 25, 1953, through May 27, 1954. At the conclusion of that period the Commission is required to allow at least seven months for negotiating with the bidders (it is not required to negotiate with only the highest bidders). Since this period should end somewhere around Christmas Day of 1954, it would appear the Commission has a pretty good chance of meeting the January 31, 1955, deadline for submitting its final report, covering the results of negotiations, to the Congress.

The Commission reached full strength on November 2 when President Eisenhower appointed a third member, Holman D. Pettibone, 59, a Chicago banker. The two other members, Leslie R. Rounds, 67, retired first vice president of the Federal Reserve Bank of New York, and Everett R. Cook, 59, president of Cook & Co., Inc., Memphis, Tenn., cotton merchant and exporter, had been appointed several weeks earlier. Mr. Pettibone, board chairman of the Chicago Title & Trust Co., was selected by the three commissioners as chairman of the Commission, and Mr. Rounds was named as vice chairman.

The Commission put in a number of days of solid work preparing the advertisement, reviewing the disposal problems with Rep. Paul W. Shafer and others, preparing instruction guides for bidders (to be available by November 25), and drawing together the nucleus of a staff. At this writing the staff consists of Ferris B. Thomas, as secretary; Harold W. Sheehan, as general counsel; and Leonard J. Ralston, as deputy general counsel. The Commission is seeking a man to take the post of executive director, sort of chief of staff and chief negotiator. One man who was offered the job turned it down. While not presently connected with the rubber industry, he had served under the late William Jeffers when Jeffers was the Government's "Rubber Czar" early in the last war. Thomas, Sheehan, and Ralston came to the Commission from the RFC. Of the three, only Mr. Ralston had much RFC experience with the rubber program.

The advertisement, which ran consecutively for three days in the newspapers, listed the facilities offered for sale as the 13 copolymer plants, the two Butyl plants, the eight petroleum butadiene plants, one styrene plant, one plant (Naugatuck) for producing dodecyl mercaptan, a fleet of 448 pressure tank cars, and miscellaneous items of equipment. In addition, it offered for either sale or lease the two alcohol butadiene plants, both of which are now in stand-by. The Commission said it would entertain proposals for a one- to three-year lease of the alcohol plants immediately and in advance of consideration of disposal of other facilities.

While all the plants were listed as separate and complete units, the advertisement contained language leaving the door open for bids on "portions of the productive capacity of particular facilities, as further discussed in the Instructions for the Submission of Proposals." This, in effect, put off for awhile, at least, a decision by the Commission on whether to offer such plants as the huge Port Neches petroleum butadiene plant (197,000 short tons a year, or nearly 40% of the total of the eight petroleum butadiene plants together) as a single unit to one buyer or to split it up into several separate units to be sold each to a different purchaser.

In the case of Port Neches that's a question on which the Attorney General will have something to say. It was discussed, prior to the insertion of the advertisement, among lawyers representing the Commission and the Attorney General (Ephraim Jacobs is the Justice Department attorney detailed to work on disposal), but no decision has been made at this writing. The bidding instructions were not available at this writing, but they are expected to spell out the bidder's option to place bids for Port Neches, and perhaps some others, on alternative bases—either the whole plant or portions of it.

"There's no question that we will have to face up to this problem," one attorney said when asked whether anti-trust considerations would permit offering the Neches butadiene plant as a single unit. He made it clear, however, that at the time the advertisement was placed the question had received only preliminary consideration.

Mr. Sheehan, the Commission's counsel, explained that the language of the advertisement cited above was purposely designed to leave open the possibility of splitting Neches butadiene and perhaps other facilities into separate, smaller units for purposes of bidding. The plant currently is operated for RFC by Neches Butane Products Co., a combination of four different petroleum firms.

The advertisement noted that descriptive brochures relating to each of the plants can be obtained by writing to the Commission's Secretary, at the Commission's offices, 811 Vermont Ave., N.W., Washington 25, D. C. (the same building which houses RFC). The Commission also stated that negotiations for each *type* of facility (the *types* beings GR-S, GR-I, butadiene, etc.) will be limited to those persons who have submitted a proposal for the purchase of such a *type* of plant. In other words, a bid offered on one copolymer plant will make that bidder eligible to negotiate for the purchase of any of the 13 copolymer plants, but not for a butadiene, Butyl, or some other type of plant.

One of the decisions made by the Commission, as disclosed in the advertisement, was fixing the interest rate on the balance of the purchase price represented by a government purchase money mortgage at 4% annually. Proposals for purchase of a facility must provide for payment of at least 25% of the purchase price in cash, and the remainder may be financed by a first-lien purchase money mortgage maturing in not more than 10 years and providing for periodic amortization (though not necessarily in equal annual installments). The interest rate on the balance of the purchase price was covered in the disposal law as passed by Congress in this language: ". . . a uniform interest rate of not less than three per centum per annum." Three per cent. was the floor, but Congress left it up to the Commission to decide the specific rate at or above that floor. The Commission elected to set the rate at 4%.

The advertisement also carries through language of the disposal law requiring a deposit equal to 2.5% of the gross amount proposed as payment in bid proposals (with a maximum deposit of $250,000). The deposit will be returned to unsuccessful bidders and will be applied, without interest, to the purchase price in the case of successful bidders. A bidder who enters proposals for several facilities, on an alternative basis, need pay a deposit only on the facility representing his highest offer. He is not required to enter deposits on the other facilities he bids upon.

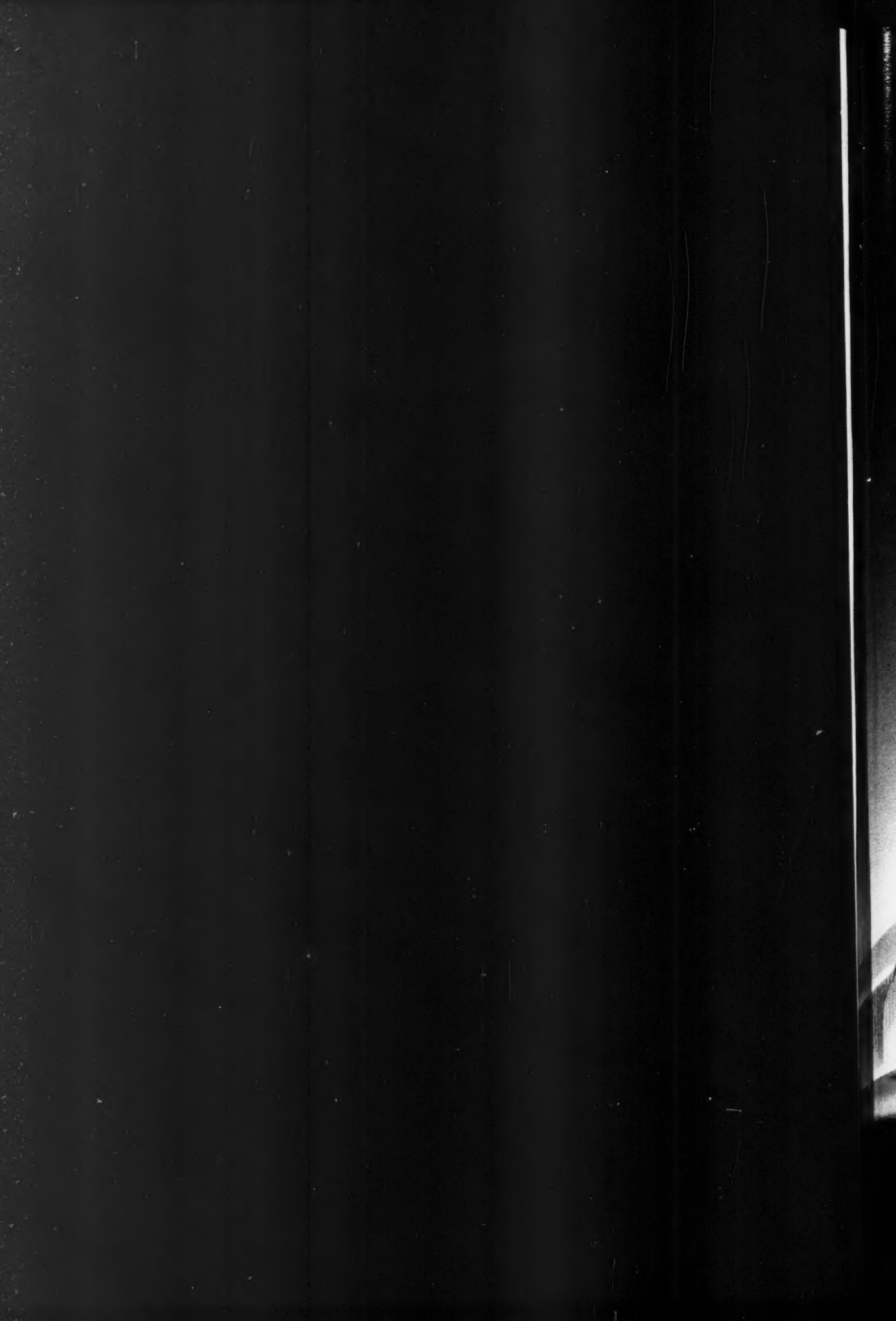
Analysis of Rubber Industry 1952 Rapid Tax Amortization Expansion Projects by BDSA

The government, since Korea, has certified for accelerated (five-year) tax amortization 180 applications covering rubber and rubber products expansion projects—facilities valued at $116 million.[2] The amount of the cost of these facilities on which the rapid tax writeoff was permitted was $53.7 million, or 46% of the value of the facilities. On the remaining 54%, normal tax amortization was required.

These figures were reported last month by S. Earle Overley, Chief, Rubber Branch, Chemical & Rubber Division, Business & Defense Services Administration, U. S. Department of Commerce. Mr. Overley gave a detailed report in a paper presented November 19 to a combined meeting in Washington of the Chemical Market Research Assn. and the Chemical Marketing & Economics Division of the American Chemical Society.

Rubber and rubber products, he reported, as programmed by DPA and administered by NPA, included three separate expansion goals: horizontal wire braided hose, tires of specified sizes and types, and miscellaneous rubber and rubber products not covered by the aforementioned. The goals were not established until early in 1952. Prior to that time an informal program for an expanded capacity of reclaimed rubber was set up, and some applications were processed. Also, a preliminary target had been formulated for horizontal wire braided hose, so additional producton could be expedited. Aside from these, applications prior to early 1952 were processed on a group or individual basis, most of which

[2] See India Rubber World, June, 1952, p. 392; July, 1952, p. 521; Aug., 1952, pp. 660 664; Sept. 1952, pp. 791, 792; Oct., 1952, p. 98; Nov., 1952, p. 245; Dec., 1952, p. 389.



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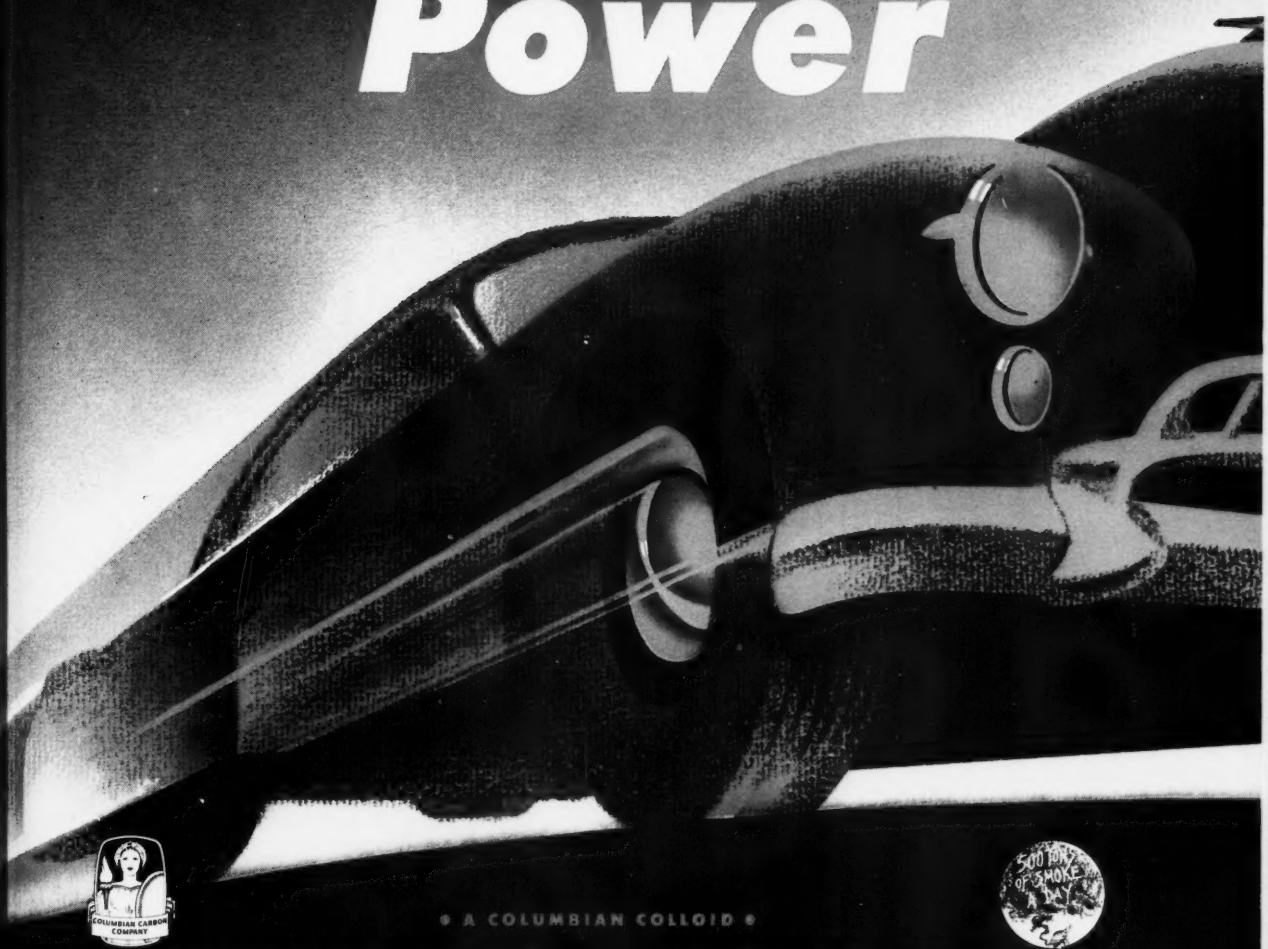

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were predicated on the need of expanded manufacturing facilities to fill defense contracts.

Tires

Surveys and spot checks by the former NPA Rubber Division indicated a shortage of capacity in certain-size groups of tires of the capacity which would be needed to meet defense and essential civilian needs in a full mobilization economy. These size groups fell in the vulcanizing press sizes of 55 inches and up. The capacity in these groups, as of January 1, 1950, was 37,500 units a day; while mobilization demand was estimated at 60,000 units a day. As a result, NPA asked and DPA approved an expansion of 22,500 units a day for airplane, truck and bus and tractor-implement casings. Applications covering projects providing almost all of this desired expansion were certified during the first quarter of 1952. Total dollar value of the facilities certified was $75 million, of which $28 million, or 37%, was permitted the rapid tax writeoff. No new plants were authorized. The distribution of the expansion was, as far as possible, based on the historic pattern of the industry. There were 67 net certificates for facilities in 25 cities in 14 states. The expansion in Akron was only between 7% and 8%; whereas the general pattern is approximately 30%. At present, capacity in the 55-inch or greater tire size groups is 52,000 units a day. The full goal of 60,000 units daily should be attained by 1955.

"Short of an all-out major war," Mr. Overley said, attainment of the 60,000-a-day goal will provide "an excess of facilities for civilian and military provided that all old facilities are maintained."

Horizontal Wire Braided Hose

NPA's capacity survey showed that the 25 million feet per year capacity existing on January 1, 1950, would be short by 45 million feet of estimated military and essential civilian requirements. At the time (early 1952), production problems made it "expedient to be liberal as to the amount of facilities certified. Military specifications were extremely severe. In order to get wider distribution several companies which had not been producing in this field were considered; therefore, full production with military approval of the product could not be expected for a period of time." All told, 18 certificates have been issued in this program, one of which has lapsed without action by the company. The 18 certificates covered $8.4 million worth of facilities, and the rapid tax writeoff was conferred for $5.1 million, or 61% of the total $8.4 million value of the proposed facilities. Forty per cent. of the expansion is in new locations. At present, the capacity approximates 62 million feet per year, or eight million shy of the goal. No further expansion is anticipated, however, until new military requirements are made available, and enough time has elapsed for producers to have ironed out the bugs in their production methods; so they can meet military specifications for the product. Barring a major war or major change in military specifications, the present capacity should be enough to supply all demand anticipated through 1955. Military need of this product is high compared to civilian need.

Miscellaneous Rubber and Rubber Products

The goal was set at $80 million, but was different from other goals in that this dollar figure was a ceiling, and no effort was made to certify up to that amount. The goal was subdivided, for convenience, into 11 groups; the most important for which certificates were issued were special-purpose synthetic rubbers, reclaimed rubber, rubber parts for tank track assemblies, microporous separators for batteries, fuel cells and precision seals, gaskets and rings. Reclaimed rubber was set up as an expansion project early in 1951, before the formal expansion goals were determined. Pre-Korean capacity for producing reclaimed rubber was about 385,000 long tons annually, given all-out production. Expansion to provide an additional 87,000 tons has been certified to date. At present, capacity is about 465,000 tons, and by the middle of 1954 it should total about 475,000 tons.

"This amount," Mr. Overley said, "is more than ample for peacetime operation, but might be fully utilized in case of an all-out war. This would depend upon the supply of other rubber, the adequacy of the natural rubber stockpile, and other factors of like nature."

Most of the applications in the 10 other groups in this miscellaneous catch-all goal were processed on the basis of military contracts and technical know-how, provided that there were no open facilities with companies which could readily qualify.

In the miscellaneous group, 95 applications were certified for $32.5 million worth of facilities, of which $20.6 million was authorized for the rapid tax writeoff. Practically all these facilities are in production today and in general should satisfy the defense and essential civilian needs in wartime. Additional expansion would be needed in certain groups on a very selective basis if an all-out emergency should exist.

Other BDSA Items

At the same chemical industry meeting the head of the BDSA's Chemical & Rubber Division, Norman E. Hathaway, announced that the division will meet with its new industry advisory committee on December 14. This will be the first industry advisory committee drawing its membership from both the rubber and the chemicals industries. Heretofore, in Commerce Department industry bureaus, the rubber industry had its own IAC composed entirely of rubber company men. While the agenda has not been published at this writing, one of the topics expected to receive attention is the need of studies on measures which might be taken in the Post-Attack Planning field, that is, preparing so as to assure rapid return to production after enemy bombing attack.

Mr. Hathaway announced also that his division is resuming its series of "Industry Reports," which had been suspended shortly after the Korean outbreak. The division also will expand its foreign trade studies, keep better track of industry expansion, and attempt to provide a larger voice for the views of rubber and chemicals manufacturers in determination of government programs in which they are involved. He also plans to seek enlargement of the division's staff from the present 39 employes to 55 employes next year.

The Rubber Branch's activities presently include gathering and publication of production data, Post-Attack Planning studies, keeping on top of developments in the rubber industry, and answering inquiries from other government agencies and from industry. All indications point to a serious effort being made to get the rubber industry started on concrete steps in the Post-Attack Planning field, some of which were outlined to the industry in February, at a meeting of the former NPA Rubber Industry Advisory committee. One of the specific suggestions at that time was to locate new airplane tire plants elsewhere than in the Akron area, because present production facilities for these tires are overly concentrated, from the point of view of vulnerability to air attack, in that area. It is expected that BDSA will try to work out with industry measures in the Post-Attack Planning field which can be undertaken without heavy financial burden or undue inconvenience. Such measures could be a starter, before tackling more difficult or costly measures.

The statistical data now being gathered by the Rubber Branch include monthly data on consumption of rubber and quarterly data showing consumption as divided between transportation and non-transportation products. The latter formerly was supplied to the NPA on a monthly basis. One series of figures which has been discontinued was monthly data on tire production and inventories. This is published by the RMA.

Bill to Reduce Tire Excise Taxes Drafted

Noah M. Mason (Rep., Ill.), a member of the tax-writing House Ways and Means committee, has drafted a bill revising the excise tax structure which, among other things, would reduce tire excise taxes, which now stand at 5¢ a pound on tires and 9¢ a pound on inner tubes, to a flat 5% of the manufacturer's price.

Mr. Mason, who plans to introduce the bill when Congress reconvenes in January, said his proposal will lower three-quarters of the present excise tax rates, but produce about the same amount of revenue as the present rate schedules. The Mason bill would do this by replacing the present rate schedules with a flat 5% national manufacturers' excise tax on all items except food and medicines.

The prospects of Congress acting favorably on a national manufacturers' excise tax bill—Mr. Mason's or anyone else's—are exceedingly slim, since many Congressmen, of both parties, have already labeled the proposal as a national sales tax masquerading under another name; and a national sales tax is probably the last thing any Congressman would vote for in an election year. Opponents of this tax contend that the tax, regardless of where it is leveled, would be passed on to the consumer.

Both tire manufacturers and tire dealers, testifying before the Ways and Means committee last August, asked for reduction in the current manufacturers' excise taxes on tires and tubes, and eventual elimination of that tax. They had argued that the tax is an anachronism in the present day when the passenger-car has taken on the status of a necessity, rather than the luxury it was at the time when the tire taxes first were imposed.

RFC Production and Sales

RFC officials met with the agency's Rubber Industry Advisory Committee on November 24, where they reported to the industry members on December's planned production and outlined projected production schedules through February, on the basis of forward orders placed through February. Part of the meeting was taken up with a discussion of the operation of the new sales policy, instituted with November orders, under which RFC requires forward orders for a 90-day period from all but small-volume consumers. Officials

reported that the new forward-order plan was working well and without complaint from purchasers.

RFC reported that actual sales during October totaled 43,337 long tons for GR-S and 4,832 tons for Butyl; while November production had been scheduled at 42,700 tons for GR-S and 6,000 tons for Butyl. October sales included 28,894 tons of LTP GR-S; 6,155 tons of black masterbatch; 10,170 tons of oil masterbatch; 2,245 tons of oil-black masterbatch; and 3,213 tons of GR-S latex. The preliminary November production schedule called for 28,250 tons of LTP GR-S; 6,500 tons of black masterbatch; 7,160 tons of oil masterbatch; 1,565 tons of oil-black masterbatch; and 3,625 tons of GR-S latex.

Other National News

Shafer Warns against Complacency in Bids on Synthetic Plants at RMA Meeting

The RMA, in connection with the regular meeting of its members, revived this year the annual meeting of rubber manufacturers which was held prior to World War II. This year's meeting took place at the Waldorf-Astoria Hotel, New York, November 17, and was attended by about 200 representatives of the management group of the rubber industry.

In addition to talks by various officers of the Association including A. L. Viles, president, and W. J. Sears and R. R. Ormsby, vice presidents, the meeting was featured by a talk by Congressman Paul W. Shafer, author of the Rubber Act of 1948 and chairman of the House Armed Services subcommittee, which wrote the House version of the Rubber Producing Facilities Disposal Act of 1953. The annual meeting of the RMA members in the afternoon included the election of new members to the board of directors of the Association.

Shafer Says Private Synthetic Industry Vital

Shafer warned the rubber industry executives against complacency in connection with their bidding for the synthetic rubber plants because he felt that the issue at stake extended beyond whether there was continued government ownership of the synthetic rubber facilities. Government ownership of the raw materials of one basic industry could well be the forerunner of ever-increasing intervention, he warned. Pointing out that three basic industries are vital to our national security—rubber, steel, and oil—if any one of these three falls within the permanent structure of government bureaucracy, then we may see the first cell developed in a growth which may eventually engulf our entire private enterprise system, Shafer added.

"In my opinion, we stand on the threshold of a great decision, and that decision may well determine whether the rubber industry will exist part government owned and part free. It may even be that your industry will be the first to succumb to industrial socialization, the ultimate penalty you may pay unless you firmly resolve that this great new synthetic rubber industry will be privately owned, privately expanded, privately financed, and privately operated," the Congressman from Michigan declared.

Shafer said he was a little more optimistic about the possibilities of disposal under the new law than he was when he talked to the Manufacturing Chemists Assn. in September.[3] The law can probably be made to work, he said, if all present and potential manufacturers of synthetic rubber and its component materials make up their minds to buy these plants and get the government out of the rubber business. If the rubber industry is entertaining thoughts of quick profits, low bids, and easy negotiation, however, then there will be the greatest avalanche of condemnation ever heard in the halls of Congress.

"I think in all fairness I should add that even after you have bid for these plants what they are worth and have made every effort to encourage diversified ownership, there is always the possibility that it is too late, and that the government will be in the rubber business from here on out," the Michigan Congressman soberly added.

If the government stays in the rubber business, it may expand and improve its own facilities and thus keep private industry out of the field entirely. If this happens, the rubber industry will be dependent on the government for more than one-half of its basic raw material, and if the raw materials are controlled, then further control may not be too far off, it was predicted.

Shafer said he was enthusiastic about the selection of the three Rubber Facilities Disposal Commissioners, and of extreme importance was the fact that the Commission has firmly determined to make all of its own decisions—not on the basis of any agency recommendations—but on the basis of its own conclusions. He said the Commission had authorized him to say the advertisement of the government's synthetic rubber plants would begin on November 18, proposal would be accepted beginning November 25, and that bidding would be terminated on May 25, 1954.

In conclusion, Shafer stated he had great confidence in the rubber industry, and he did not want to be interpreted as accusing the industry of planning to make token bids for the synthetic rubber facilities in the hope that the government will stay in the rubber business. He said he knew that most of the leaders of the industry are willing to stake their future on the possibilities of synthetic rubber. The management of the industry has a staggering responsibility in connection with disposal of the synthetic rubber plants. The speaker congratulated the industry leaders on their past accomplishments and wished them well for the future.

Viles Sees Continued Industry Growth

Mr. Viles, speaking at the morning session on "The Rubber Manufacturing Industry Looking Forward to 1960," emphasized that the great variety of useful products manufactured by the rubber industry, particularly those connected with highway transportation, industrial uses, and the protection of health, have developed a universal demand so great that it does not require extraordinary imagination to foresee how this industry became one of the most strategic and important producers of necessary and useful products for our country and the entire world.

The elements of growth which make the future hold bright promise for the rubber goods manufacturing industry are the applications in thousands of different ways to the mass-produced vehicles and appliances which are a part of nearly every American home, the rising population curve in this country, and the $50 million a year spent by the rubber industry on research activities which bring new products to market nearly every month.

The dependency of other industries on rubber products is a tremendous factor in this promise of growth and coupled with the needs of the automotive industry, which uses an average of 238 pounds of rubber on every passenger car, makes an impressive market, he added. Literally thousands of new uses in heavy industrial goods have been developed.

By 1960 we will see a substantial increase in the industry's total requirements for rubber, and unless there is a vigorous replanting program in the natural rubber areas and a substantial expansion of synthetic rubber producing capacity in this country, we may have a serious rubber shortage in the next decade, it was concluded.

Sears on Rubber Supply

W. J. Sears, in talking on "Will There Be Enough Rubber?" stated that the rubber industry should be able to look forward with some confidence to an assured supply of natural and synthetic rubber at reasonable prices, provided it takes advantage of all sources of information for intelligent planning and procurement. In this connection he reviewed the work of the RMA Crude Rubber Committee over the past several years aimed toward reestablishing the RMA types as recognized world standards, in order to improve the quality of the natural rubber used by the American fabricating industry.

There has not been any apparent relation between natural rubber quality and its supply or price, and the representatives of the natural rubber producing industry claim that the average producer cannot operate profitably at the present levels. A review of forward estimates of total world rubber consumption through the year 1958 against natural rubber production and synthetic rubber producing capacity indicates adequate supplies of new rubber. The price of natural rubber under ordinary circumstances should be related to the price of GR-S, and Sears saw no reason why the present 23¢-a-pound price might change materially under private operation of the GR-S plants.

The United States is using natural rubber to the extent of somewhat less than 45% of the total. If natural rubber use in 1954 increased to 50%, it is possible that there will be no surplus of natural rubber production over consumption in that year. After 1955 there will not be available enough natural rubber to maintain 50% use in the United States, and the ratio may decline to 35% of the total by 1958.

Perhaps price is still the most important factor in determining the relative consumption of natural and synthetic rubber in products where they are freely interchangeable without loss of quality. In the

[3] See our Oct., 1953, issue, p. 80.

A Part of the Speaker's Table at the RMA Annual Meeting *(Left to Right)*: H. E. Humphreys, Jr., Chairman and President, United States Rubber Co.; John L. Collyer, Chairman and President, The B. F. Goodrich Co.; J. R. Blanford, Counsel, House Armed Services Committee; and Rep. Paul W. Shafer, of Michigan

years ahead, however, when improvements in synthetic rubber quality can be anticipated as the result of private competitive research, the problem of natural rubber quality becomes more significant, Sears declared.

"We believe that there lies ahead a very important period of technical competition between natural and synthetic rubber. Anything that is done now to improve natural rubber quality is in the long-range interests of both natural rubber producers and consumers," he concluded.

Halligan on RMA Statistical Activities

The RMA's statistical activities are concerned primarily with the collection of information desired by members of the industry, although monthly releases of limited information are issued to newspapers, trade magazines, industrial organizations, and financial houses, it was explained by C. W. Halligan, RMA treasurer. These releases are restricted to information formerly published by the government relating to unit shipments, production, and inventory of various types of tires and tire repair material. Similar releases are distributed pertaining to the country's imports, consumption, and stocks of rubber by types.

Mention was also made of the sales research committee formed in 1949 for surveying tire manufacturers' stocks in the hands of distributors and the tax committee concerned primarily with the excise tax on tires and its reduction or possible elimination.

A completely revised accounting manual for the industry is expected to be ready in 1954.

Ormsby on Industrial Relations

One of the difficulties facing rubber manufacturers today in the field of collective bargaining is the pattern-type of negotiations, according to Ross R. Ormsby, vice president and general counsel of the RMA. In recent years companies in the rubber industry have been asked by employe representatives to negotiate agreements based upon settlements made by other manufacturers both in and outside the rubber industry.

The rubber goods manufacturing industry, because of its great product diversification, does not lend itself to this form of collective bargaining, as may be the case in other industries. For instance, the only common denominator between a tire manufacturer and companies producing heels and soles, rubber footwear, or small molded and extruded mechanical rubber goods is the raw material involved in the manufacturing process, Ormsby pointed out. The production problems, marketing factors, labor costs, and many other operating conditions are entirely different.

Rubber goods manufacturers were advised that they should stress their own individual problems in collective bargaining negotiations and arrive at solutions to these problems based upon the circumstances surrounding each manufacturer.

"Operation Cooperation"

An overall summary of RMA activities was presented by George Flint, secretary of the Association. The RMA has 161 individual members representing about 85% of the country's rubber consumption, and the subordinate Association or product divisions are seven in number, that is, tires, mechanical goods, heels and soles, footwear, sundries, hard rubber, and coated materials. Each product division is quite autonomous in operation, and most have a neutral chairman drawn from the Association's staff. In addition, several departments of the Association contribute to the general welfare of the industry as a whole. These are the traffic, industrial relations, crude rubber, accounting and statistics, and the Association's Washington office.

During the Association's fiscal year ending September 30, 1953, its various divisions and committees held 141 meetings with an attendance of 3,792 company representatives. Examples of many of the activities of the product divisions and other departments were related.

A 45-page booklet distributed at the meeting outlined the broad as well as more specific aspects of the Association's activities, and this booklet included the personnel of the RMA board of directors, its officers, and many of its general and product division committees.

In addition to many leaders of the industry seated at the speaker's table during the luncheon at which Congressman Shafer spoke, guests of honor included Willis C. Armstrong, deputy director, Office of International Materials Policy, U. S. State Department; J. R. Blanford, counsel, House Armed Services Committee; and E. D. Kelly, director, Office of Synthetic Rubber, Reconstruction Finance Corp.

New RMA Directors Elected

At the meeting of the RMA members, the following were elected directors of the Association with terms to expire in 1956: H. Gordon Smith, vice president, United States Rubber Co.; C. D. Garretson, president, Electric Hose & Rubber Co.; J. P. Seiberling, president, Seiberling Rubber Co.; Harry E. Smith, vice president, Raybestos Manhattan, Inc., and Thomas Robins, Jr., president, Hewitt-Robins, Inc.

Also elected directors were W. S. Richardson, executive vice president, The B. F. Goodrich Co., with a term ending in 1955, and A. A. Garthwaite, president, Lee Rubber & Tire Corp., with a term expiring in 1954.

The full board of directors of the Association totals 14 persons.

Evaluation and Battery Additives Committees' Reports on Bureau of Standards

Secretary of Commerce Weeks made public on October 16 the report of the Scientist's Committee for Evaluation of the present functions and operations of the National Bureau of Standards in relation to present national needs and their recommendations for the improvement and strengthening of the Bureau. This Committee was headed by Mervin J. Kelly, of Bell Telephone Laboratories, and included representatives from nine scientific and technical societies.

The Commerce Secretary said he was in complete accord with the views of the Evaluation Committee. Most significant of the recommendations follow: (1) higher level of activity in basic programs; (2) modernization of facilities and increased space for basic programs; (3) improvement of organization at the associate director level; (4) transfer of weaponry projects to the Department of Defense; (5) continued use of the Bureau by Department of Defense and Atomic Energy Commission for non-weaponry science and technical aid; (6) continued and increased use of the Bureau by other agencies of government in indicated areas of science and technology; (7) decrease in repetitive test operations at the Bureau; (8) division of primary responsibility for policy and procedure on commercial product tests between the Secretary of Commerce and the Director of the Bureau; (9) increased support of standard samples program; (10) advisory groups to the Director selected from membership in eight scientific and technical societies.

Other major general recommendations reached by the Committee included tribute to the vital importance of the Bureau to national strength, the splendid record and tradition of the Bureau, the competence, integrity and loyalty of the Bureau's professional men, and the need of services of the Bureau as the range and depth of our technology become greater.

Secretary Weeks said that the Committee members had rendered a valuable service to the nation in making this study of the Bureau of Standards, and that he had followed closely the work of the Committee, and where it appeared important to implement the recommendations as they have crystallized, he had done so.

Increased financial support for the statutory functions of the Bureau is being considered for the coming year. Policy and procedures of a non-technical nature in connection with the handling of commer-

cial products tests are to be reviewed in the future by the Secretary of Commerce and the Director of the Bureau.

The Evaluation Committee's report should not be confused with the Committee on Battery Additives of the National Academy of Sciences, which was appointed by Secretary Weeks on April 17, and headed by Zay Jeffries, retired vice president of General Electric Co., to investigate the Bureau's work on battery additive AD-X2 during the past several months.

The report of the Battery Additives Committee was made public by Secretary Weeks on November 13. In its conclusions the committee said:

"We conclude from our studies and investigations that the quality of the National Bureau of Standards in the field of lead storage battery testing is excellent. This statement is made without reservations.

"Our opinion is that the quality of the work of the Bureau in this field is better now than at any time in the past. This is partly because of the closer cooperation of the Bureau's Statistical Engineering Laboratory with the Electrochemical Section in the design and in the interpretation of battery tests."

Secretary Weeks in his statement accompanying the report of the Battery Additives Committee said that the scientific evaluation of the committee on this problem is an assurance to the public and a source of satisfaction to him and to the Bureau. He said he would do all in his power to aid the Bureau in maintaining this high level of scientific service to the nation.

Firestone Sales Pass $1 Billion

Harvey S. Firestone, Jr., chairman of the board, Firestone Tire & Rubber Co., announced, November 6, that more than $1 billion worth of products and services were purchased by customers of the Firestone company during the 12 months ending October 31, to establish a new sales record for the company.

In setting this record Firestone is the second rubber company to report an annual sales volume in excess of $1 billion dollars. The other company is the Goodyear Tire & Rubber Company.

Mr. Firestone also presented an encouraging picture for the rubber industry in estimating that total demand for tires in 1953 will equal or slightly exceed the all-time record year of 1950. He also foresees 1954 in the rubber industry as a year of high employment with production being planned at normal capacity levels.

Emphasis on Sales and Research Needed in 1954

Prosperity for the rubber industry in 1954 will demand greater emphasis on research leading to new products, intensive salesmanship, and well-planned product distribution, according to Joseph A. Hoban, vice president, replacement sales, B. F. Goodrich Tire & Equipment Division, speaking before the American Trucking Association in Los Angeles, recently.

Replacement passenger-car tire sales in 1953 are expected to reach about 49 million units, representing a 12% increase over 1952 figures. It was estimated that these sales would rise to 51 million units in 1954.

Replacement truck sales are expected to total about 8.75 million units this year and 10 million units by the end of 1954.

Hoban pointed out that the list price of a popular-size tire is only 55¢ higher now than in 1950, and that motorists today are paying only 71¢ per 1,000 miles, in contrast to $2.27 per 1,000 miles in the 1920's.

Good Profits Ahead?

Standard & Poor's Corp., New York, a financial statistical service, in another of its "Industry Surveys—Tire and Rubber," dated October 29, 1953, suggests that a period of good profits is ahead for rubber fabricators. In support of its position it cited that composite sales of 11 rubber companies for the first half of their 1953 fiscal years rose 7.8%. Increased tire shipments were a major contributor, but, in addition, newer lines, including foam rubber and chemicals, continued their growth trend, and, despite shifts in some accounts, special military work exceeded that of a year before.

In some cases profit margins were under pressure from keener competition in tire and industrial lines, higher costs of labor and materials, and/or reduced volume; however, several companies scored gains. The rise in combined taxable earnings of nine reporting companies was 12%.

A full-year gain in tire shipments is looked for. The second-half showing in non-tire lines, including military, should be similar to that in the first six months. Full-year industry sales are expected to score a moderate gain over those of 1952, to reach a new peak, it was said.

A moderate drop in tire shipments is indicated for 1954 and is predicated on lower vehicle production and smaller military takings. Replacement volume for tires should increase. Deliveries of special defense items and industrial lines are expected to fall short of the 1953 experience, as a result of the stretch-out in the arms program. On the other hand, further growth is expected in foam rubber and chemicals, so that balancing all factors, total sales are expected to run at an excellent level.

The contraction in 1954 pretax earnings will be more severe than that in sales, but important benefits resulting from the end of the excess profits tax should permit some gains in final earnings, and where declines occur, they should not be serious.

Also, the rubber goods manufacturing industry chalked up profits, before taxes, of $152 million in the second quarter of 1953 for a gain of 10% over the first-quarter showing of $138 million, according to the latest issue of "Financial Reports for U. S. Manufacturing Corporations," a joint publication of the Federal Trade Commission and the Securities & Exchange Commission.

After payment of taxes, the industry's profits were $55 million in the second quarter, or 8% higher than $51 million in the first quarter. This figure compares with the overall figure for the 23 manufacturing industries surveyed of $3 billion in profits after taxes during the second quarter, a gain of 6% over the first-quarter figure. Of the 23 different industries, 16 showed increased profits after taxes in the second quarter.

Seiberling, URWA Sign New Contract

Seiberling Rubber Co. and the United Rubber Workers of America, CIO, signed a new wage and working conditions contract on November 9, following negotiations which began in July, but were recessed during the period of negotiations between the union and the Big Four rubber companies. The contract had been rejected earlier in the negotiations until certain parts were spelled out in more detail.

The new contract is essentially the same as that signed between the Big Four companies and the URWA in that it includes a 2½¢-an-hour wage increase; monthly pensions for retired workers now have a maximum of $125 instead of $100 a month; two weeks' paid vacation is given after three years' service; and triple time is paid for holiday work. In addition, the paid-up life insurance for employes now amounts to $3,500, and the hospitalization and medical benefits are available on the same terms as with the Big Four companies.

The new contract runs until April 1, 1955. The 2½¢-an-hour wage increase is retroactive until August 31.

Just prior to the signing of the contract the company sent four-page special delivery letters to members of Akron local number 18, outlining the history of the negotiations and pointing out the benefits in the proposed agreement.

Meanwhile, other companies talking with the URWA for new wage and working agreement contracts are American Hard Rubber, RCA Rubber Co., Eclat Rubber Co., and Sun Rubber Co.

Chester H. Peterson

Peterson to Succeed Nesbit

Chester H. Peterson, since August, 1952, executive vice president of U. S. Rubber Reclaiming Co., Buffalo, N. Y., will become president of the firm January 1, 1954, it was announced November 24 by Milton Dammann, chairman of the board. Mr. Peterson will succeed Jean H. Nesbit, president of the company since 1942, who on January 1 will become chairman of the executive committee.

Mr. Peterson came to the reclaiming company in 1950 as vice president in charge of production. He played an active role in the development and production of the company's new powdered rubber, Flo-Mix, which went on the market this fall.

Mr. Peterson, 45, is a graduate of the University of Wisconsin. Before coming to the 70-year-old Buffalo products firm, he was associated with Firestone Tire & Rubber Co., Ford Motor Co., Pennsylvania Rubber Co., and The General Tire & Rubber Co.

Stutz, Silver Advanced

The New Jersey Zinc Sales Co., 160 Front St., New York 38, N. Y., has made G. F. A. Stutz manager of technical service, to succeed Bruce R. Silver, now technical assistant to Vice President R. G. Kenly.

Stutz is a veteran of more than 30 years' service with the parent company, mostly in the research department; he became manager of research in 1951. The next year he was made assistant general manager of The New Jersey Zinc Co. (of Pa.), at Palmerton, Pa.

Silver was manager of technical service for the past 24 years.

3M Promotes Several

Promotion of four men of its adhesives and coatings division was announced last month by Minnesota Mining & Mfg. Co., St. Paul, Minn.

John P. Albade was upped to assistant industrial sales manager and will headquarter in Detroit. He joined the company as a sales engineer in 1947 and was sales manager of the Chicago division until his recent promotion.

Named to the post of regional industrial sales manager, William A. Angus, Jr., will headquarter at Bristol, Pa. Angus started with 3M in 1949 as an adhesives and coatings salesman serving industrial users in the Baltimore area.

Also made regional industrial sales manager was Donald J. Malone, who will move to the Chicago area after six years as an adhesives and coatings salesman, with headquarters in St. Paul.

Howard F. Norman was promoted to the position of product manager, government sales. He will be working with the development and technical service departments obtaining qualifications of products under government specifications. Norman came to 3M in 1940 as a chemist in the Detroit adhesives and coatings division. He recently was regional industrial sales manager for the division in the New York area.

Appointment of Edward L. Decker to general sales manager of the industrial trades tape division also was announced last month. Decker joined 3M in 1937. His most recent assignment was central regional sales manager in the industrial tape division with offices in Chicago. He will now be stationed in St. Paul.

Fallon in New Post

E. P. Lambert Co., First National Tower, Akron 8, O., dealer and broker in crude rubber and liquid latex and representative for Neville Chemical Co., recently made William H. Fallon secretary. Mr. Fallon and Vice President Alan MacCracken also were elected company directors.

The firm's other officers are: E. P. Lambert, president and treasurer; and D. M. Lambert, vice president.

American Viscose Corp., producer and supplier of high-tenacity rayon cord to the tire industry, has opened a sales office at 2304 First National Tower Bldg., Akron, O. This office will be in charge of Cyril Sumner, formerly with the New York rayon tire yarn sales division of the company.

Bruce R. Silver

G. F. A. Stutz

Oscar Nelson *(Center)* Receiving Congratulations from President Evald B. Lawson, of Upsala College; Dr. Karl G. Pearson, of the College Faculty, Is at the Left

Frank Taylor has switched from Commercial Solvents Corp. to Chicago Copper & Chemical Co., Blue Island, Ill.

Foxboro Branch in Amarillo

The opening of a branch office in Amarillo, Tex., was announced November 2 by The Foxboro Co., Foxboro, Mass., manufacturer of industrial instruments for the measurement and control of process variables. Located at 1117 La Paloma St., the new branch was made necessary by expanded industrial activity in the region, particularly in the oil and gas, chemical and petrochemical industries.

Assigned to the office as industrial engineer is D. T. McElligott, formerly with the Foxboro office in Dallas; he will serve instrument users in parts of Oklahoma and New Mexico, besides the Amarillo area.

This new branch is the sixth to be established by Foxboro in Texas; others are at Houston, El Paso, Corpus Christi, and Odessa, with repair and manufacturing facilities in the branch factory at Dallas.

Waterproof Footwear Contracts

H. W. Rollman, president of both Wellco Shoe Corp. and Ro-Search, Inc., Waynesville, N. C., has announced that Wellco-Ro-Search has entered into an agreement with Kaufman Rubber Co., Kitchener, Ont., one of the oldest rubber footwear manufacturers in Canada. Kaufman has already begun production of "Foamtread" footwear for the Canadian market, and Wellco-Ro-Search is now also contemplating the manufacture in the United States of waterproof footwear, based on Kaufman's "know how."

Many of the Wellco-Ro-Search affiliated factories all over the world are already producing waterproof footwear. On the basis of the new agreement the Kaufman "know how" and technical advancement will be made available to these affiliated companies abroad.

The affiliated factory of Wellco-Ro-Search in Israel will begin production of waterproof rubber footwear in January, 1954. Mr. Rollman also stated that the average production for the affiliated factory in Israel was in excess of 1,500 pairs a day for the regular type of "Foamtread" footwear made by the Israeli factory.

Oscar Nelson Honored

"From a humble beginning you have risen to a position of eminence in the world of business and industry, your attainments made possible only through vision, effort, persistence, and faith."

Thus read, in part, the citation to Oscar Nelson, president and general manager of United Carbon Co., Charleston, W. Va., upon whom an honorary doctor of laws degree was conferred by Upsala College, East Orange, N. J., on October 1. The event was held in connection with the college's sixtieth anniversary convocation and the degree granted in recognition of the outstanding success Mr. Nelson had attained in industry.

[Mr. Nelson died suddenly November 27. His obituary will appear next month. —EDITOR.]

Robert G. Splies has resigned as senior chemist at Solvay Process Division, Syracuse, N. Y., to join Bjorksten Research Laboratories, Chicago, Ill. He has also taught at Wisconsin State College.

Wellco-Ro-Search for Brazil

Donald McQuillen, general manager of the Alpargatas company in Sao Paulo, Brazil, recently visited the Wellco-Ro-Search operation in Waynesville, N. C. The Brazilian Alpargatas company, employing 4,200 workers, is to be affiliated with Wellco-Ro-Search for the manufacture and sale of tennis shoes with molded rubber soles in Brazil.

At present Alpargatas manufactures daily 65,000 pairs of a tennis shoe with canvas upper and rope sole, and it is contemplated to build up production in the new Wellco-Ro-Search shoe to the same daily production over the next 10 years.

The present shoe production in Brazil is totally inadequate for the population of 54 million people, says H. W. Rollman, president of both Wellco and Ro-Search.

Gussman Succeeds Rosenthal

Edwin Stein, chairman of the board of Stein, Hall & Co., Inc., 285 Madison Ave., New York, N. Y., on October 26 announced with deep regret the resignation of Morris S. Rosenthal as president and director and as a director of Stein Hall's affiliated companies.

At a special board meeting, Lawrence Gussman was elected president of Stein Hall. Mr. Gussman is also president of The Stein-Davies Co., a manufacturing subsidiary of Stein Hall, and was a vice president of the parent company in charge of its manufacturing and technical divisions.

Wood's Sesquicentennial Dinner

R. D. Wood Co., Philadelphia, Pa., manufacturer of cast-iron pipe, hydraulic presses, etc., celebrated its one hundred and fiftieth anniversary with a dinner at the Barclay Hotel in that city. A feature of the event was a half-ton cast-iron man made from pipe and fittings of the company. In attendance were E. R. Russell, president of the firm; Theodore V. Wood, vice president and general sales manager, fourth generation of the founding family; the board of directors; and representatives of other pipe manufacturers.

ATA Honors Dayton

In recognition of Dayton Rubber Co.'s contribution of $25,000 to further the educational and public relations programs of the American Trucking Association Foundation, the ATA presented to the company a framed plaque making the firm a charter member of the Foundation. A. L. Freelander, president of Dayton, accepted the award at a recent convention of the Association in Los Angeles, Calif.

Columbian Carbon Moves

The executive offices of Columbian Carbon Co., its subsidiaries, Fred'k H. Levey Co. and L. Martin Co., and its distributor, Binney & Smith Co., have been moved to larger quarters at 380 Madison Ave., New York 17, N. Y. The organization, which produces channel and furnace blacks, pigments, and printing inks, had been located in the Columbian Carbon Bldg., 41 E. 42nd St., New York, for the past 30 years.

Robert Shattuck

Shattuck Marbon President

Promotion of Robert Shattuck to the presidency of Marbon Corp., Gary, Ind., subsidiary of Borg-Warner, was announced last month by Roy C. Ingersoll, president of the parent corporation. Shattuck previously was vice president and general manager of Marbon. As president, he succeeds George P. F. Smith, whose retirement from this post will permit him to devote full time to his duties as president of the Norge Division of Borg-Warner.

H. Hunter Gehlbach, assistant secretary and assistant general counsel of Borg-Warner, has been elected secretary of Marbon Corp. E. R. Meyer, chief accountant, becomes Marbon's treasurer and assistant secretary. D. Morris Pratt has been reelected vice president and sales manager.

Shattuck joined Marbon in 1942 as assistant general manager and was named vice president and general manager in 1944. He formerly had been assistant production manager of U. S. Gypsum Co.

Marbon produces synthetic resins widely used in mechanical rubber goods and in the paint industry.

New Breaker Strip

The strength of nylon and the impact resistance and stretchability of cotton are being combined by New York Belting & Packing Co., Passaic, N. J., in a new breaker strip. Inserted between the belt carcass and the outer rubber cover in heavy-duty conveyor belts, the strips of these materials are woven and tied together into fabric.

The Cincinnati Mfg. Co., Cincinnati 12, O., recently moved into a new office building, two stories high, measuring 66 by 80 feet and containing 55,000 square feet of floor space. This new structure was necessary because of the crowded conditions in the old office and the factory building, where space was needed for manufacturing purposes.

Harold Bell is no longer with Firestone Industrial Products Co., but now is with Mid States Rubber Products Corp., Evansville, Ind.

Hooker Adds to Staff

Joseph J. Constantino has joined Hooker Electrochemical Co. as a design engineer. Jacob B. Hufford has become associated with the company as a chemical engineer in the process study group; while Frank W. Long has signed up as a chemist in the plastics and resins group in the research and development department.

Mr. Constantino was employed previously by E. I. du Pont de Nemours & Co., Inc., as an engineer on the construction of its adi ponitrile plant in Niagara Falls and for the past year worked on the construction of a nylon plant for Chemstrand Corp.

Mr. Long previously had been employed by Minnesota Mining & Mfg. Co., Ethyl Corp., General Aniline, and the Philadelphia Quartermaster Depot.

Rubarite Plant Opens

A new plant for the production of synthetic rubber powder used in rubberized asphalt for road paving has been officially opened in Malvern, Ark. Owner of the facility is Rubarite, Inc., a subsidiary of Goodyear Tire & Rubber Co., National Lead Co., and Bird & Son, Inc. Nearly 100 persons, including state and federal officials, were on hand to tour the installation and witness a 30-ton dynamite blast which was touched off to provide access to barytes, a material needed in the manufacturing process. Rubarite, described as a free-flowing, unvulcanized synthetic rubber product, is made by coprecipitation of synthetic rubber latex with extremely small particles of barytes.

Moves Atlanta Office

The Atlanta, Ga., office of Givaudan-Delawanna, Inc., and its associate companies, Givaudan Flavors, Inc., and Sindar Corp., all of New York, N. Y., was recently moved to larger quarters at 1156 Dalon Dr., N.E.

Maimin Sales Convention

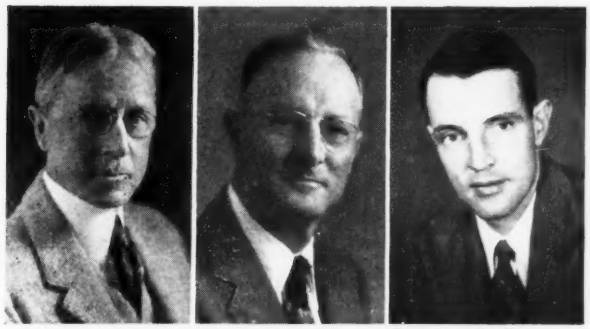
Sixty-five distributors of H. Maimin Co., Inc., manufacturer of electric cloth cutting machines, 575 Eighth Ave., New York 18, N. Y., attended the company's recent sales convention in New York. The distributors represented 28 industrial centers throughout the United States and Canada.

The two-day meeting, first held by the company in its 50-year history, concentrated on acquainting distributors with the variety of cutters now being produced by Maimin for many industries.

Moves Processing Laboratory

Farrel-Birmingham Co., Inc., Ansonia, Conn., last month announced the temporary closing of its processing laboratory until some time in March, 1954, in order to permit relocation of the facility in larger quarters adjacent to the company's general offices at Ansonia. The laboratory will be generally improved by the addition of new equipment and other devices to broaden its scope of service in helping manufacturers develop new products and processing techniques.

Baird Rubber Celebrates Its Golden Jubilee



Rappaport Studios

Wm. T. Baird, Sr. Collier W. Baird, Sr. Collier W. Baird, Jr.

As the year 1953 draws to a close, Baird Rubber & Trading Co., Inc., 233 Broadway, New York 7, N. Y., is celebrating its fiftieth anniversary and preparing to embark on its second half-century of service to the rubber goods manufacturers of the Western Hemisphere.

Over 50 years ago William Torrey Baird and his brother, Robert Breckenridge Baird, formed the Rubber Trading Co.—the name subsequently was changed to Baird Rubber & Trading Co., Inc.

William T. Baird had been with the Mechanical Rubber Co., and its predecessors, for 30 years before resigning to form the importing firm with his brother. At the time of his resignation Mr. Baird was the treasurer and a director of Mechanical Rubber Co.

William T. was president of the Baird company until 1929 and then treasurer until his death in 1941.

Robert B. Baird gained experience with Okonite Co. and the New York & Boston Rubber Co. before working for such rubber importers and brokers as George A. Alden & Co. and Otto G. Meyer & Co., in Boston prior to joining his brother in forming the Baird company. He was chairman of the board of directors at the time of his death in 1927.

Robert Lyle Baird, son of Robert B., started with the company in 1907 upon his graduation from Polytechnic Institute of Brooklyn and was vice president of the firm at the time of his retirement in 1928. He died in 1942.

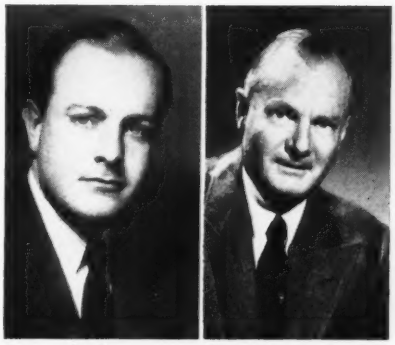
Collier W. Baird, older son of William T., entered the business in 1910, following his graduation from Yale University and was also a vice president of the company on his retirement in 1945.

William T. Baird, Jr., now president, joined the firm in 1919 after release from active service with the American Expeditionary Force. He became president in 1933.

Among the more recent additions to the firm is Collier W. Baird, Jr., who came to the company after having served in the U. S. Army during World War II. In 1948 he became assistant treasurer and a director and in 1953 secretary of Baird Rubber.

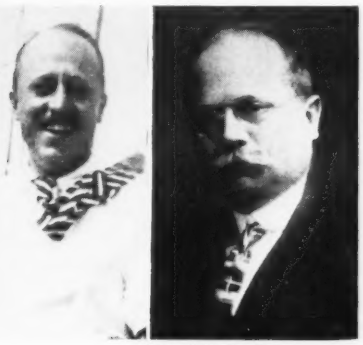
Robert B. Baird, II, grandson of one of the founders, became associated with the concern in 1948. Prior to that time he had been acting secretary and assistant to the general manager of Acme Rubber Mfg. Co., a division of Acme-Hamilton Mfg. Corp., which he had joined upon his release from the A. A. F. Air Transport Command in 1946. He was made secretary and a director of the firm in 1948 and a vice president in 1952.

Baird Rubber & Trading Co. has grown over the years to command a strong position among rubber importers. For the first 20 years the business was conducted from 9 Murray St., after which the firm moved to the Woolworth Bldg., where it is located today.



Conway Studios *Photo—Pat Liveright*

Robert B. Baird II Wm. T. Baird, Jr.



The Falk Studios

Robert L. Baird Robert B. Baird

The concern numbers among its customers many of the large rubber companies, but also has always looked after the needs of the smaller companies.

In addition to William T., Jr., C. W., Jr., and R. B., II, other present executives of the firm are Denis P. Mochary, vice president and a director, and Paul A. Mulach, sales executive. Mr. Mochary has been with the company for 20 years. Mr. Mulach, formerly vice president and general manager of Institutional Services, Inc., Brooklyn, N. Y., has been with the firm only about a year.

At the end of 1952, Harold W. Holcome, who had been in the crude rubber business for more than 40 years, retired from Baird Rubber after 18 years of service.

Baird Rubber executives have up-to-date knowledge of conditions in the natural rubber producing areas by virtue of their frequent trips abroad. Also throughout its history the company's officers and executives have had a thorough knowledge of rubber and its use because many of them have worked in rubber goods manufacturing plants or have taken specialized university courses to familiarize themselves with the needs of their customers.

Paul Conaway has joined the plastics division of Celanese Corp. of America, New York, N. Y., as a sales representative in the Midwest district, with headquarters at 1514 Merchandise Mart, Chicago, Ill. Mr. Conaway formerly had been with Reynolds Metal Co.

Structural Adhesives

Synthetic rubber cements, combined with resins into liquid structural adhesives, are the best means for bonding many of today's newly developed materials and alloys, according to R. V. Yohe, of The B. F. Goodrich Co. In pointing out that a half-inch square bond of aluminum to aluminum will support more than a ton, Mr. Yohe predicted that use of these bonding agents will be extended from the high-speed aircraft field, where they are currently employed, to the building construction industry.

Military jet airplanes use bonded structural assemblies to obtain semiflexible joints unaffected by vibration and temperature extremes and possessing more strength with less weight than conventional riveted joints. The elimination of localized stress areas created by rivets and bolts, and of weak areas due to soldering and to welding between dissimilar metals are other advantages reported for this application of the adhesives.

In the construction of housing facilities, porcelain panels, consisting of two porcelain sheets with a honeycomb structure bonded between them, have been used successfully. The panels make possible the erection of buildings in less time and with a much lighter steel framework than is permitted with conventional methods.

Another product covered by Mr. Yohe in his recent Cleveland speech was organic solder. This product, when processed into films, reportedly possesses tensile strengths up to 10,000 psi, and permits up to 90% elongation.

N. J. Zinc Buys Va. Mine

The New Jersey Zinc Co., 160 Front St., New York 38, N. Y., has purchased a mining property in Mineral, Va., known as the Arminius Mine, which has been inactive nearly 30 years.

The company has had the property under option for purchase since 1951, at which time a program of exploration was started to determine the pontentialities of its mineral deposits, principally with respect to zinc and lead. Diamond drilling has been under way for some time. The results of this drilling led to the decision to purchase the property, unwater the mine, and continue exploration at depth. Pumping and mining equipment necessary for these operations will be installed as soon as possible.

The work will be conducted under W. L. Albers, superintendent of N. J. Zinc's Austinville, Va., operation.

Monsanto Reorganizes Set-Up

Improvements in Monsanto Chemical Co.'s organization designed "for maximum coordination and integration of effort in a growing company," were announced at St Louis, Mo., on November 18 by President Charles Allen Thomas.

The new structure, effective January 1, was described as "retaining the decentralized division-type line and staff organization which has contributed greatly to Monsanto's growth, but at the same time realigning the divisions and a few staff departments to enable more efficient coordination in anticipation of the company's future growth."

The board of directors, with its executive and finance committees, will exercise the customary policy direction of the company. Membership of these two committees remains unchanged. Executive administration will be lodged in the president, the new position of executive vice president, and six executive officers who will have functional responsibilities in their respective specialized fields of interest.

R. R. Cole, a vice president of Monsanto since 1941 and a director since 1944, becomes executive vice president.

Vice presidents, with their functional responsibilities for specific fields of interest, follow: Felix N. Williams, manufacturing; John L. Gillis, marketing; Carroll A. Hochwalt, research, development, and engineering; Francis J. Curtis, personnel; and W. W. Schneider, general counsel. Edgar M. Queeny, board chairman, will continue to exercise supervision over the financial aspects of the company's activities.

The new organization will have eight staff departments rather than 10, as in the past. The departments will be: accounting, advertising and public relations, general development and patent, personnel relations, law, medical, purchasing and traffic, and treasury.

Thomas explained that for better product alinement and to provide a cohesive basis for future expansion, the Merrimac, Texas, and Western divisions will be absorbed by other divisions having compatible product lines.

The phosphate division will be renamed the inorganic chemicals division and will be headed, as before, by Vice President J. L. Christian as general manager. It will continue to operate the phosphate division plants at Soda Springs, Idaho; Monsanto, Tenn.; St. Louis; Trenton, Mich.; and Anniston, Ala. This division also will operate the Merrimac Division plants at Everett, Mass., and Camden, N. J.

The organic chemicals division, headed by Charles H. Sommer, Jr., of Boston, now general manager of the Merrimac Division, will continue to operate its plants at St. Louis, Monsanto, Ill., Nitro, W. Va., and Norfolk, Va., and will take over the operation of the Western Division's new plant at Avon, Calif.

A new division to further the engineering and research activities of the company will be established under the direction of J. R. Mares, of Texas City, vice president and currently general manager of the Texas Division. This new research and engineering division will include the functions of the central research department at Dayton, O., the general engineering department at St. Louis, and the engineering sales department of the organic chemicals division.

The plastics division remains under General Manager Robert K. Mueller, of Springfield, Mass. In addition to its plants at Springfield and Port Plastics, O., this division will operate Western Division plants at Long Beach and Santa Clara, Calif., and Seattle, Wash., and the Texas City plant of the Texas Division.

The merchandising division continues under General Manager Roy L. Brandenburger, of St. Louis; and the overseas division, under General Manager Edward A. O'Neal, Jr., of St. Louis.

Irving C. Smith, of Santa Clara, now general manager of the Western Division, will move to St. Louis as assistant to the president and as chairman of the budget committee.

N. N. T. Samaras, of Dayton, director of the central research department, remains in that capacity as a part of the research and engineering division.

William T. Nichols, of St. Louis, presently director of the general engineering department, will become assistant to Hochwalt in the executive offices to work on important special projects.

All general managers and staff department heads will be headquartered in St. Louis.

Polyethylene Plant Site

The location of Monsanto Chemical Co.'s new polyethylene production unit at Texas City, Texas, has been announced. Expected to go on stream in the latter part of 1954, the new facility will be supplied with ethylene from the company's existing plant located adjacent to the selected site. An initial annual capacity of 66,000,000 pounds of the product is expected, with 50% increased capacity scheduled for 1957. The production of polyethylene will reportedly make Monsanto the first company to produce the "Big Six" of plastic materials for molding and fabricating industries.

Toy Advertising Campaign

A Christmas toy advertising program, featuring specially designed material for toy outlets and a magazine spread, has been undertaken by Monsanto to presell toys made of Lustrox styrene plastic. Theme of the campaign, "Christmas That Lasts Longer," ties in with the durability and color stability of the products.

Streamers, pennants, counter cards, newspaper mats, and radio scripts prepared by the company are being distributed to toy outlets for their use in promoting sales through the various media. In addition, some 18 toys manufactured of styrene are to be presented to the general public in a three-page advertisement in the December issue of *Good Housekeeping*.

New Dewey Enterprise

Bradley Dewey on November 18 announced formation of Bradley Container Corp., of which he will be president, to manufacture and market plastic tubes and bottles made by a newly developed European process for which the company has exclusive U. S. and Canadian patent rights.

The new company has leased more than 150,000 square feet of floor space in one of the buildings of the Assabet Mills in Maynard, Mass. The lease runs for 10 years, with an option to renew.

Manufacturing operations are expected to commence upon the completion of certain improvements in the property and the installation of equipment. Mr. Dewey, who retired last year as president of Dewey & Almy Chemical Co., estimated that there would be more than 100 people employed by the end of January, and that employment would build up to about 300 persons within a year.

Hewitt Executive Changes

Two changes in the sales operations department of the industrial rubber products plant of Hewitt-Robins, Inc., Stamford, Conn., were announced November 3 by C. W. Mackett, who is manager of that department.

Kenneth L. Way becomes the assistant manager of sales operations, reporting to Mr. Mackett. Mr. Way was formerly manager of hose sales and development and previously had held other executive positions during a 25-year period with the company.

Harry Knechtel is new manager of hose sales and development. With the company since 1940, Mr. Knechtel started in the factory and later joined the inspection department. After service in the U. S. Air Force, he returned to Hewitt-Robins in the technical department as a hose development engineer. In 1952 he transferred to the sales division as an assistant product sales manager.

A. F. Dantino has been appointed production manager of the industrial rubber products plant of Hewitt-Robins in Buffalo, N. Y., it was announced November 5 by Frank Blanchard, factory manager, who also stated that Harold Stockman has been named production superintendent, responsible to Mr. Dantino.

The latter has been with the company 15 years, where he started as a belt maker after his graduation from Syracuse University.

Mr. Stockman has been with Hewitt for 29 years. He began as a factory inspector and advanced through various jobs, as assistant foreman, foreman, and night superintendent.

Then, on November 10, the company reported the appointment of three new assistant controllers: Austin Franklin, in charge of all accounting matters of the rubber, conveyors, and engineers divisions as well as the Korb-Pettit subsidiary; Howard Stoughton, responsible for all accounting and financial matters relating to the international division and also responsible for certain corporate financial matters; R. B. Lape, responsible for all accounting matters pertaining to the foam rubber division.

It was also announced that E. P. Meyer has been named controller of the company's foam rubber plant in Buffalo, reporting to Mr. Lape, and E. G. Shuttleworth has been named controller of the industrial rubber products plant in Buffalo, responsible to Mr. Franklin.

E. B. Gardner is controller of Hewitt-Robins, Inc.

Two Vice Presidents Named

Directors of Hewitt-Robins elected Ellis B. Gardner and Robert A. Nilsen vice presidents, it was revealed November 25 by Thomas Robins, Jr., president.

Mr. Gardner since 1950 has been controller of the company. He is responsible for financial and accounting functions as well as government relations. He is a member of the Rubber Industry Advisory Committee to the Defense Materials Agency and is also an alternate member of the State Department's Rubber Advisory Panel. He has been with Hewitt since 1946 and prior to that time had been with General Electric Co.

Mr. Nilsen, who joined Hewitt in 1946 when it entered the foam rubber field, was in charge of foam production operations at Buffalo until the middle of 1952, when he became general manager of the division. Previously he had been with United States Rubber Co. at Mishawaka, Ind.

Melville C. Vaughan

Michael D. Vaccaro

Witco Names Sales Managers

Witco Chemical Co., 260 Madison Ave., New York 16, N. Y., recently announced the appointment of two new sales managers.

Included was the promotion to eastern sales manager of Michael D. Vaccaro, who has been active in the Witco sales force in Pennsylvania, New Jersey, and New York. Mr. Vaccaro joined the company in 1937 in the New York office traffic department. He is a member of American Chemical Society; New York Rubber Group; Philadelphia Ink Production Club; Philadelphia Rubber Group; and the American Chemical Industry Salesmen's Association.

Melville C. Vaughan has been advanced from salesman to sales manager of the Cleveland, O., office. He started with Witco in 1932 as a chemist in the New York laboratory and was transferred to the Cleveland sales force in 1947. He belongs to the Division of Rubber Chemistry, A. C. S.; Akron Rubber Group; Buffalo Rubber Group; and Cleveland Paint Production Club.

Bemis Buys Packaging Firm

All outstanding stock of Flexible Package Co., Chicago, Ill., has been purchased by Bemis Bro. Bag Co., St. Louis, Mo., according to F. G. Bemis, president. Present plans are to operate Flexible Package Co. under the same name and under the same managerial and operational personnel, as a wholly owned subsidiary.

Flexible Package, one of the pioneers in the polyethylene bag business, makes polyethylene bags of all kinds and sizes, including liners. Flexible recently also started the manufacture of bags made from Polycel, one of the newest packaging materials, which combines the features of cellophane and polyethylene.

New Voit Research Building

A 3,200-square foot structure to house the research and development department of W. J. Voit Rubber Corp., Los Angeles, Calif., was opened recently. On the site of the company's main plant in Los Angeles, the building will serve as headquarters for the personnel engaged in experimentation, testing, and development of rubber and rubber-covered athletic goods and of automotive hose, camelback, and tire repair materials manufactured by Voit. The department, which consists primarily of technical personnel, will also be concerned with the design and construction of manufacturing machinery and the improvement of present production methods.

Richardson "Pressvues" Materials Handling and Automatic Weighing Developments

Richardson Scale Co., at a press party at its Clifton, N. J., plant, October 30, demonstrated some of the results obtained from the work being done in its new materials handling and weighing equipment laboratory. The laboratory, completed in 1952, has provided means for the study of the flow of solid materials in bins and hoppers, and considerable information on the pressure exerted by different materials on the bin discharge opening and on the lateral and vertical pressures existing at different points within the material mass. A general equation for flow in any bin of symmetrical shape may soon evolve from this work.

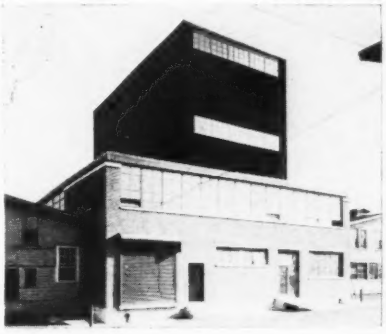
New equipment announced and demonstrated included an automatic tare-weighing system, a remote-controlled proportioning system, a rotary pocket feeder, and a Y-veyor.

With the automatic tare-weighing system, a drum, can, cylinder, or box is automatically tared and then filled with product until a selected weight is reached. The precise weight of the product in the container is then recorded or printed for permanent record. Key items in the taring process are extremely precise transducers, consisting of a military-type synchromechanism adapted to commercial use. The transducers are used to cancel the unbalance in an electrical circuit created by the weight of the empty containers. The system is particularly suited for handling petroleum, dairy, food, or chemical products—any liquid or solid product in any operation where savings of a few ounces or pounds resulting from overages or underages mount to considerable sums over a month's or year's time.

The remote-controlled batching process, now being installed in the concrete and in the rubber industry, feeds ingredients from storage bins to one or more automatic scales where they are cumulatively weighed either as one complete batch or parts thereof. One man, working a panel board, sets up the operation which proceeds and repeats itself automatically. The same military-type synchromechanisms as used in the automatic tare-weighing system control the weighing operation by turning on and shutting off the flow of material to the weigh hopper according to the settings on the panel. Although essentially a batching process, the system can turn out formulated product in a continuous stream. With automatic batching scales, accuracies are in the order of 0.1%; while the accuracies with a continuous weigher are about 1%.

The new rotary feeder developed by Richardson successfully handles exceptionally sticky or flushy materials. Key design feature is a rubber pocket that increases and decreases in volume when charging and discharging. There are 36 pockets; each one is five inches in diameter, and they tend to suck in the product with a minimum of air and urge material out at discharge. In operation, the feeder is attached to the bottom of a bin. Feed drops into the machine and fills the pockets on the periphery of the feeder's drum. The material is carried around and out the bottom of the machine and delivered to processing equipment.

The new Y-veyor consists of two three-foot spiral conveyors, which form the arms of the "Y," and a specially designed seven-foot, three-inch V-belt sewing conveyor, which forms the leg of the "Y." A controlling mechanism at the receiving end of the sewing conveyor prevents filled open-mouthed bags, passing from the spiral conveyor, from spilling, tipping, or twisting. The Y-shaped conveyor permits two men packing products in textile or multiwall bags to turn out as much as three or four men might pack normally using older systems. Using automatic scales with oscillating or bounce packers, the Y-veyor turns out up to 16 100-pound bags a minute, depending on the kind of material handled. Using automatic scales and auger packing, it can turn out 14 100-pound bags a minute.



Richardson Scale's New Material Handling Laboratory

Lignin Products Division

The formation of a new division to broaden the commercialization of lignin products has been announced by West Virginia Pulp & Paper Co., 230 Park Ave., New York 17, N. Y. The new organization, to be known as the petrochemicals division, will be located at Charlestown, S. C., and will be concerned with the production, development, sales, and administration work involved in the lignin operation.

The company is reportedly capable of an annual production of 144,000 tons at this facility. Present demands for the lignin are for use of the product in asphalt emulsions, as a dispersing agent in rubber, as an extender in rubber latex compounds, etc.

Neoprene Type Discontinued

Effective January, 1954, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., will stop producing Neoprene Type FR, according to a recent announcement. A suggested replacement for the material is Neoprene Type WRT which, when blended with small amounts of GR-S, is reported to have been used successfully in some applications where the FR compound had been employed.

Sales Office Moved

The Detroit, Mich., sales office of Givaudan-Delawanna, Inc., and its associated companies, Givaudan Flavors, Inc., and Sindar Corp., 330 W. 42nd St., New York 36, N. Y., has moved to 18228 Mack Ave. The expanded facility will be under the direction of R. M. Stevenson.

Duncan J. MacLennan

MacLennan Made Sales Manager

Duncan J. MacLennan has been appointed sales manager of the plasticizer division, Pittsburgh Coke & Chemical Co., Pittsburgh, Pa., according to Henry Avery, manager of the division. Mr. MacLennan has been sales representative of the division in the New England area. Previously he had been sales research and planning manager for Whitney Chain Co., and also had been associated with Godfrey L. Cabot, Inc.

At the same time it was announced that James F. Hall, Jr., has been appointed sales representative for the plasticizer division in the Pittsburgh area. Mr. Hall received his degree in chemical engineering at the University of Pittsburgh in June, 1953.

Seiberling Promotes Several

Seiberling Rubber Co., Akron, O., last month announced several changes among its personnel.

Robert H. Dinkelman has been named to the staff of the industrial relations department. He had joined Seiberling two years ago as a time-study engineer and for the last seven months was general foreman of the passenger tire curing department.

Thomas M. Pullin has been promoted to general foreman of passenger tire curing and water bag preparation. He started with the company a year ago as foreman in the mat curing department and transferred to passenger tire curing a short time later. Previously he had been a foreman at the Seiberling Latex Products Co. for 17 years.

Norman F. Heydinger has been appointed assistant manager of the sales statistical department. Heydinger comes to Seiberling from Libbey-Owens-Ford Glass Co.

First of 1954 Tires

The first of the 1954 line of tires from Seiberling, the improved Super Service passenger-car tire, has been introduced to the public. Rated in the original equipment class, the product contains rayon cord in the carcass, cold synthetic rubber in the treads, and discolor- and crack-resistant agents in the sidewall rubber. The Super Service, available in all sizes with black or white sidewalls, has been in the company line for many years.

Expands West Coast Plant

Coinciding with the twenty-fifth anniversary of its manufacturing on the West Coast, The B. F. Goodrich Co., Akron, O., recently completed a $2,000,000 building and equipment expansion program at its Los Angeles, Calif., plant which will increase tire and tube production capacity there by at least 20%.

This plant, the company's first branch tire manufacturing unit outside of Akron, occupies a 46-acre tract at 5400 E. Olympic Blvd. in East Los Angeles and today employs about 900 persons.

The two-million dollar expansion program, which started in June, 1952, includes new tire vulcanizers and a larger and newly equipped factory cafeteria. Other additions completed in the expansion plan are a 77,000-square-foot warehouse section, a relocated and modernized tube manufacturing department, and new machine shop. The plant now comprises a total of 776,690 square feet. Buildings representing 251,200 square feet have been added during the past two years, making the plant one-third larger than in early 1951.

Principal products manufactured at the plant are tires and tubes for passenger cars, trucks, buses, aircraft, off-the-road and farm equipment; camelback for tire recapping; and rubber lining of metal pipe for the chemical industry.

Fritz Retiring; Schoenfeld His Successor

Howard E. Fritz, vice president in charge of research for Goodrich, will retire on his regular retirement date, January 1, 1954. Dr. Fritz joined the company in 1925 after having served on the engineering school faculty at Ohio State University. He was placed in charge of a small department engaged in bonding rubber to metal. Under his leadership this division grew to the extent that it was frequently referred to as "an industry within an industry." In 1934 he took over the direction of the development and sales of Koroseal. Then in 1946, Dr. Fritz was made vice president of The B. F. Goodrich Co. in charge of research, and he is now in charge of the Goodrich research center, where he is continuing to coordinate the work of the research staff on fundamental scientific endeavors.

Frank K. Schoenfeld, since 1946 vice president—technical of B. F. Goodrich Chemical Co., a division of The B. F. Goodrich Co., has been elected vice president—research of the parent company. Dr. Schoenfeld assumes his new duties upon the retirement of Dr. Fritz.

The new Goodrich research director started with the parent company in 1927 as a chemical engineer. Following early research work in vinyl resins, he was appointed manager of Koroseal research and development in 1939, heading a research team that developed new processes for producing several types of vinyl chloride. In 1942 he became director of Koroseal and plastics research. In 1944, Dr. Schoenfeld was made director, technical and development, of Goodrich Chemical.

During World War II and since, Dr. Schoenfeld has been responsible for all technical operations in three man-made rubber plants operated for the government by the company. He is also the author of a number of technical papers and is the holder of patents in the fields of pigments, adhesives, rubber derivatives, polymerization, man-made rubbers, and plastics. Dr. Schoenfeld belongs to the A. C. S. and the AICE.

Harry B. Warner succeeds Dr. Schoenfeld at Goodrich Chemical.

Frank K. Schoenfeld

Van Petten Named Advertising Head

Harold E. Van Petten has been appointed director of advertising for the Goodrich industrial products division. Van Petten, in the advertising field for the rubber industry for the past 26 years, is a graduate of Illinois State Normal University. After brief work with other companies, he joined Goodrich in 1927 and in 1929 took over industrial products advertising. In December, 1943, he was named manager of tire advertising as well as industrial products. In 1948 he became manager of national advertising for the industrial products division and retained that title until his recent appointment. Van Petten was named "adman of the year" in 1952 by *Industrial Marketing* for his direction of the company's industrial products advertising campaign, which was also called "the best of 1952" by the magazine.

"Postmark" and Credit in Sale of GR-S

The only transmittal date that will be accepted by the Reconstruction Finance Corp. is the date of the "postmark" placed on the envelope containing any enclosures by the Post Office Department. Statement of this new policy is contained in an amendment to "General Sales and Distribution Circular for Government Synthetic Rubbers," dated September 30, 1953, covering procedure and basis for the sale of certain dry GR-S rubbers. In view of this stipulation, the use by a purchaser of a P. B. meter or similar procedure for stamping envelopes containing orders "will not supply proof of the date any enclosure was sent."

The amendment also states that any purchase and sale agreement will be effective upon the issuance of shipping orders (covering purchase orders) or acceptance of forward orders by the RFC. The purchase price will depend on the transmittal date, and its payment will depend on the credit status of the purchaser. Companies whose credit is not established will be required to forward payment to the distributing agent as soon as a copy of the shipping orders is received. Established creditors are allowed 30 days in which to pay if the purchaser has paid for all previous shipments from the Corporation; otherwise payment must be delivered prior to shipment.

Revises Executive Structure

The Okonite Co., for 75 years a producer of electrical wires and cables, has expanded its administrative and executive structure, creating the new post of chairman of the board and emphasizing the area of research and product development. These steps were taken at a board meeting November 20.

The broadening of the scope of management functions, which resulted in the installation of Albert F. Metz as chairman of the board and chief executive officer, R. Stuart Keefer as president, and Edward D. Youmans as vice president in charge of research and product development, has been brought about by a sharp growth in volume of business accompanied by vastly more complex operations.

All these appointments involve present personnel. Metz, Keefer, and Youmans were, respectively, president, vice president in charge of sales, and vice president in charge of manufacturing and research.

Charles M. Kirkland, factory sales manager at the Passaic plant, has been elevated to vice president in charge of sales; while David W. Nurse, resident manager of the Wilkes-Barre plant, has been promoted to vice president in charge of manufacturing for the company's three factories.

The complete departmentalization of the research activities recognizes the important role product development has played in building the corporation to its present position in the electrical industry, and the essential part this phase is expected to play in maintaining and increasing the high level of customer acceptance of its products.

With Keefer assuming the responsibility of executing all operating functions, Metz will be able to spend a greater portion of his time in the determination of policy, long-range planning, etc.

Metz joined Okonite as an accountant in 1919. Rising swiftly through the ranks, he was appointed comptroller in 1924, elected a director and treasurer in 1928, vice president in 1945, and president in 1949.

Keefer entered the wire business in 1922, at Hazard Mfg. Co. When that company was reorganized as a division of Okonite in 1927, Keefer continued as assistant sales manager. In 1946 he was appointed sales manager of the entire company and was transferred to the executive offices at Passaic. He was named vice president in 1947 and elected a director the same year.

Youmans started with the company 40 years ago as a laboratory assistant. He was named technical manager in 1928, vice president and technical director in 1943, vice president in charge of manufacturing and research in 1951, and a director in 1952. Youmans has made notable contributions to the development of insulated wires and cables, particularly in adapting synthetic rubber-like materials to these items.

Kirkland started his business career with Okonite in 1934. Following two years in the chemical laboratory, he entered the sales department and was appointed secretary of the company in 1939. After military service from 1942 to 1945 he returned to Okonite and in 1947 was made manager of the latex and small wire department. Subsequently he was appointed sales manager and became factory sales manager in 1950.

Nurse began with the company in 1942 as a sales representative in the San Francisco office, after several years in the electrical wholesaling field. In 1947 he was made manager of the Portland district office, but early in 1950 was transferred to the Wilkes-Barre plant as assistant sales manager. Later that year he became factory sales manager and in 1953, resident manager in charge of both sales and manufacturing for this plant.

Opens Larger L. A. Branch

A new distributing branch and warehouse has been opened by United States Rubber Co. at Soto and E. 46th St., Los Angeles, Calif. The building provides district sales offices and warehouse areas for U. S. tires; Fisk and Gillette tires; footwear and general products; wire and cable; and mechanical goods divisions of the company.

Considerably larger than the previous one at Eighth and San Pedro Sts., in Los Angeles, the new location is 224 by 540 feet, giving 120,960 square feet of floor space. According to company officials, its expanded facilities are necessary to provide proper service to the fast-growing markets in southern California, Arizona, New Mexico, southwest Texas, and portions of Utah and Colorado.

The newest types of equipment, designed to speed customer service, are available on the premises. These include belt-handling devices, vulcanizing apparatus, electrically operated fork-lift trucks, and special machinery for coupling hose and preparing other industrial items for commercial use. Docks provided make it possible to load or unload eight freight cars and 15 trucks at one time.

The property includes a parking lot large enough to accommodate customers and the 170 employes of the branch. A cafeteria-type lunch room is also in operation.

Company executives headquartered here are: C. F. Goff, branch operating manager; H. R. Stout, credit manager; Pacific Coast sales managers, A. H. Finnern (footwear and general products), L. M. Guibara (wire and cable); Los Angeles district sales managers, J. A. Napier (U. S. tires), W. F. Beardsley (Fisk and Gillette tires), D. H. Meissner (mechanical goods), and R. H. Slate (footwear and general products).

Kralastic Plant for Baton Rouge

Ground has been broken at Baton Rouge, La., for new production facilities for Kralastic, a resin-rubber plastic developed by Naugatuck Chemical Division. This new plant will triple the present output of the material when operation is begun in July, 1954.

Naugatuck Aromatics Sold

The assets of the aromatic chemicals department of Naugatuck Chemical have been purchased by Roubechez, Inc., New York, N. Y., for an undisclosed amount. These assets include equipment, chemical processes, and inventories, but not real estate. The aromatic chemicals and essential oils handled by Naugatuck Aromatics have been used largely by the soap and the cosmetic industries.

Changes in Personnel

W. O. Jelleme, assistant merchandise manager of the textile division, who was in charge of market research, retired November 30, according to W. E. Clark, vice president and general manager of the textile division of the rubber company. Mr. Jelleme will continue, however, as a part-time consultant on merchandising and market research matters for the division.

Raymond A. All, assistant to the merchandise manager, was advanced to the new position of manager of market research, effective December 1. He now will be responsible for marketing research, market surveys, and sales analysis for all products of the textile division and will report directly to Mr. Clark.

Staton J. Peele, manager of sales and production coordination, has been appointed administrative assistant to W. D. Johnson, merchandise manager, and John H. Jenkins will succeed Mr. Peele as manager of sales and production coordination.

Mr. All joined U. S. Rubber in 1937 at the Hogansville, Ga., plant. Later he was with the Winnsboro, S. C., plant, and has been at the New York general offices since 1944. Before service as assistant to the merchandise manager, he had been manager of industrial relations and labor standards in the textile division.

Mr. Peele was employed at the Hogansville plant in 1947 and has been headquartered in the New York general offices since 1950.

Mr. Jenkins joined U. S. Rubber in 1941 at the Hogansville plant, but has been in the New York offices since 1944.

J. W. Pressler has been appointed district manager at Springfield, Mass., and Merrill E. Kirsch has been named branch manager at Cincinnati, according to H. C. Oliver, sales manager for the U. S. tires division. Both men promoted have been in the tire business since 1937. Mr. Pressler joined the company in 1950 and has been in truck tire sales at Baltimore. Mr. Kirsch started with U. S. Rubber in 1948 and recently was a truck tire salesman in Cincinnati.

Name Change Announced

Shell Chemical Corp., 50 W. 50th St., New York 20, N. Y., is changing the name of its Julius Hyman & Co. Division to the agricultural chemicals division, effective January 1, according to L. V. Steck, Shell Chemical's marketing vice president. The division, with headquarters in Denver, Colo., will continue to market aldrin, dieldrin, endrin, DD, and other insecticides and agricultural chemicals. Mr. Steck stated F. W. Hatch will continue as manager, with J. J. Lawler as sales manager. The division has district offices in Atlanta, Ga.; Houston, Tex.; Jackson, Miss.; New York; San Francisco, Calif.; and St. Louis, Mo. Mr. Steck indicated that this change affected only the sales organization. The plant in Denver continues to be operated by Julius Hyman & Co.

Alcohol Denaturing Facilities

Shell Chemical recently commenced operation of an alcohol plant in Argo, near Chicago, Ill., to furnish the most widely used grades of specially denatured alcohols and propietary solvents to customers in the upper Midwest. The plant is an addition to the general storage and distribution facilities that the company has been using at that location.

Along the same line, Shell has also announced an expansion of its denaturing plant at Sewaren, N. J., in order better to serve East Coast customers with this product.

C. A. Hemingway has been appointed Ohio district sales agent for ADM Rubber Makers Stearic Acid for the chemical products division of Archer-Daniels-Midland Co., Cleveland, O. This company, an early pioneer in the processing of this stearic acid, has been a constant supplier of the material to the rubber industry. In addition, Archer produces fatty chemicals in the form of acids, alcohols, glycerides, and sperm oils for practically every industry in America.

NEWS ABOUT PEOPLE

Power Plant Modernization

The final unit of the $8,000,000 power plant modernization program of Goodyear Tire & Rubber Co., Akron, O., has been completed with a resultant increase in the efficiency of power production by about 11% and a great reduction in the amount of smoke and fly ash which leave the stack. This last unit was built at the company's Plant 2 in Akron at a cost of approximately $4,500,000.

Features of the new facilities are two Stirling-type Babcock & Wilcox water tube boilers, having a pressure capacity of 975 pounds and capable of producing steam at 835° F. The boilers, in addition to producing process steam, also power a turbine which generates 12,500 k.w. of electricity.

Personnel Promoted

L. E. Poston, assistant manager of general accounting at Goodyear for the past 12 years, has been promoted to manager of that department, to succeed J. H. Long, who became assistant comptroller.

J. E. Hockwalt, assistant division manager of the foreign comptroller's department, has been named to Poston's former position. Hockwalt, in turn, will be replaced by Sherman B. Bailey, assistant treasurer for the company in Brazil.

Poston has been in accounting during his entire Goodyear career, since 1936.

Hockwalt started with Goodyear as a ledger clerk at Boston in 1932, was promoted to various office positions and later was office manager both in Alliance, O., and in Battle Creek, Mich. Later he was assistant manager of retail field operating.

Bailey started with Goodyear in the comptroller's foreign department and was office manager at the company's Venezuela plant before going to the Goodyear plant in Sao Paulo, Brazil.

Theodore E. Lannefeld has been named technical service representative responsible for Ohio and Michigan, for Heveatex Corp., Melrose, Mass. Mr. Lannefeld, after five years as a chemist for A. C. Lawrence Leather Co., transferred to Monsanto Chemical Co. and was instrumental in organizing and building up its textile chemical division. More recently he has served in a similar capacity with B. B. Chemical Co.

Marshall Studio

Theodore E. Lannefeld

Franklin Farrel, 3rd, *(Left)* Receiving His 20-Year Pin from Farrel-Birmingham Secretary Joseph Le May

Franklin Farrel, 3rd, executive vice president of Farrel-Birmingham Co., Inc., Ansonia, Conn., was among those who received a 20-year service pin from the company at its recent service-pin award ceremony. Mr. Farrel is the son of Franklin Farrel, Jr., retired chairman of the board, and is also a fourth-generation descendant of Almon Farrel, who with his son, Franklin, Sr., founded the company in 1848.

Arthur H. Swanson has been appointed director of purchases and general credit manager for Stauffer Chemical Co., 420 Lexington Ave., New York 20, N. Y. Mr. Swanson, with Stauffer for 22 years, was formerly purchasing agent and general credit manager for the eastern division of the company. He will continue his headquarters in New York.

Bert Ovesen, formerly of Phoenix Mfg. Co., is now devoting full time as an officer of Metro Rubber Products Corp., Willow Springs, Ill.

Robert W. Koch, who served as a special assistant to the Secretary of Defense, Charles E. Wilson, for the past seven months, has returned to Akron to resume his duties as director of purchases of The Firestone Tire & Rubber Co.

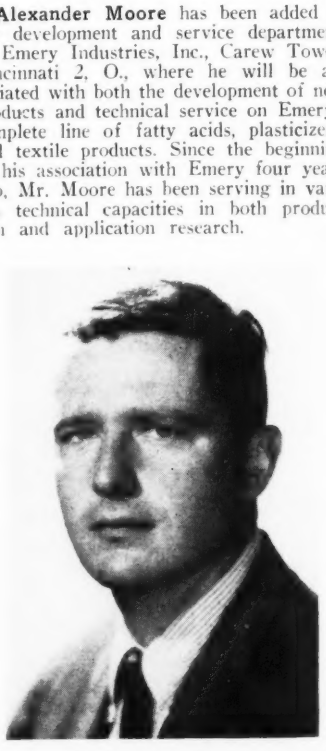
J. Ernest Miller has been appointed defense contract coordinator for B. F. Goodrich Chemical Co., Rose Bldg., Cleveland, O. With headquarters in the Cleveland office, Miller will also represent the company in connection with the forthcoming disposal of government owned synthetic rubber plants. Miller recently returned to Goodrich Chemical after having been on loan to the government for 17 months as deputy director, Office of Synthetic Rubber, in Washington, D. C. Previous to that assignment Miller had been plant manager from 1945-1952 at the Port Neches, Tex., synthetic rubber plant operated for the government by Goodrich Chemical. Miller started with The B. F. Goodrich Co. in Akron in 1933 as a production worker. He held various jobs, including that of shift foreman, and in 1942 was transferred to the Goodrich operated Lone Star Ordnance plant, Texarkana, Tex., as auxiliary loading superintendent. He was made production manager at Port Neches the following year and in 1945 became plant manager.

Sidney A. Paradee has been appointed Chicago district representative of the chemical products division of Archer-Daniels-Midland Co., Cleveland, O., with headquarters at 927 Blackhawk Ave., Chicago 22, Ill. He has had broad experience in chemical products, oils, and fats. The ADM chemical products division produces Hydrofol fatty acids and glycerides, Adol fatty alcohols, and ADM sperm-oil products for a wide variety of uses in the manufacture of such products as lubricants, oils and greases, pharmaceuticals, cosmetics, paints, textiles, rubber, leather etc.

Peter R. McClure has joined the staff of the plasticizer division of Godfrey L. Cabot, Inc., Boston, Mass., at Cabot's research and technical service laboratories, 38 Memorial Dr., Research Row, Cambridge, Mass. This appointment is another step in the division's program of offering greater service to the plastics industry through expanded organic research and technical service. Mr. McClure will primarily be engaged in the solution of specific customer technical problems. Since 1944, he has been actively engaged in the plastics industry, with particular emphasis on vinyl compounding and processing. He is a member of the Society of Plastics Engineers and the Society of the Plastics Industry.

Miss Rachel J. Fanning has resigned as chemist in the Rubber Section, National Bureau of Standards, Washington, D. C., to become research associate of the American Dental Association, Research Fellowship, National Bureau of Standards.

Alexander Moore has been added to the development and service department, of Emery Industries, Inc., Carew Tower, Cincinnati 2, O., where he will be associated with both the development of new products and technical service on Emery's complete line of fatty acids, plasticizers, and textile products. Since the beginning of his association with Emery four years ago, Mr. Moore has been serving in various technical capacities in both production and application research.



Alexander Moore

Carl Hammon

Carl Hammon has joined the engineering staff of the hydraulic press division of Erie Foundry Co., Erie, Pa. He was formerly with Watson-Stillman Co. for 18 years.

C. E. Draper has left Mid States Rubber Products Corp. for Sun Rubber Co., Barberton, O.

R. P. Dinsmore, vice president in charge of research and development at Goodyear Tire & Rubber Co., was awarded an honorary membership in the National Council of the American Institute of Chemists at a recent meeting of the Ohio Chapter of the Institute at the Mayflower Hotel in Akron, O. Dr. Dinsmore's contributions to the advancement of chemistry, particularly in the rubber field, were cited by **A. A. Somerville,** vice president, R. T. Vanderbilt Co., and **Albert J. Gracia,** manager, Goodyear Atomic Corp., who addressed the gathering on the occasion.

J. L. Collyer, president of The B. F. Goodrich Co., has been cited as an example of an outstanding business leader whose vision and understanding of world affairs has been valuable to the nation. This appraisal appears in the October issue of *National Biographic*—a publication distributed to high school students and more than 2,000 institutions of higher learning throughout this country.

Harold H. Vischer has been advanced to manager of passenger tire sales for The Firestone Tire & Rubber Co., Akron, O. Mr. Vischer, most recently manager of truck tire sales for the Boston, Mass., district, joined the Firestone College Training Class in 1937 and completed his sales training in the Detroit, Mich., district. He then became a service representative in Indianapolis, Ind., and, next, service manager of the Minneapolis, Minn., district and in 1943, sales and staff assistant in the service department at the company's home offices in Akron. In 1949 he was made manager of the Geneva, N. Y., store and in 1952 went to Boston.

Harvey Wahn has joined Corduroy Rubber Co., Grand Rapids, Mich. He had been with Hawkeye Rubber Mfg. Co.

J. R. Moore, president of Harwick Standard Chemical Co., Akron, O., has been elected a director of Pennsylvania Industrial Chemical Corp., Clairton, Pa. For many years Harwick Standard has been a distributor of PICCO products.

James W. Harley, director of traffic of United States Rubber Co., has accepted the chairmanship of the Rubber Division in the campaign of the Travelers Aid Society of New York to raise $364,000.

R. L. Wilson, manager of raw materials and by-products for Diamond Alkali Co., Cleveland, O., was honored November 11 as company executives and other business associates held a dinner for him at the Union Club, Cleveland, in recognition of his 28 years with this manufacturer of basic chemicals. Wilson's retirement brings to a close a chemical career with Diamond Alkali extending back to 1925, when he joined the organization at Pittsburgh, Pa., to take over the task of volume coal-buying. This was later broadened to include all raw material purchases as well as administration of sales activities for the company's Painesville plant and coke operations. Executives from nearly 20 companies and a large number of Diamond men joined President Raymond F. Evans in "saluting" Wilson for his work with the firm.

Ted Young is now employed by Central Rubber & Mfg. Co., Belvidere, Ill. His former employer was Diamond Wire & Cable Co.

L. F. Hickernell, chief engineer for Anaconda Wire & Cable Co., Hastings-on-Hudson, N. Y., has been named chairman of the technical program committee for the winter general meeting of the American Institute of Electrical Engineers to be held at the Hotel Statler, New York, N. Y., January 18-22, 1954. Mr. Hickernell is also chairman of the Institute's technical operations committee and a member of the public relations committee, and his group will supervise the technical sessions at which advances and developments concerning the profession will be reviewed.

Charles R. Snyder, assistant secretary and comptroller, has been named assistant general sales manager of The Wooster Rubber Co., Wooster, O., manufacturer of Rubbermaid houseware products. Snyder joined the company in July, 1949, as head of the cost accounting department and had moved up to the position of assistant secretary. Before coming to the Rubbermaid organization, Snyder had worked for Dresser Industries and International Derrick & Equipment Co.

J. D. Sharkey has been named manufacturers sales manager of The Firestone Tire & Rubber Co., Akron, O. He has been eastern division sales manager of Firestone since 1949, with headquarters in New York, N. Y. Mr. Sharkey joined the company on December 15, 1930, as a salesman in Milwaukee, was transferred to Kansas City as a truck tire representative in 1932, and was named assistant district manager the following year. In 1934 he was sent to Omaha as district manager. From 1938 to 1945 he served as district manager in Chicago. His next move was to Akron on November 1, 1945, when he became manager of the Midwest sales division.

Gardner L. Brown

Gardner L. Brown, a specialist in rubber reclaiming practice, has been appointed a sales engineer by Pennsylvania Industrial Chemical Corp., Clairton, Pa. Before joining the company, Mr. Brown had been with Goodyear Tire & Rubber Co., where he had spent 10 years in the rubber reclaim development. He also had served Goodyear in the compounding and processing sections and with Goodyear Atomic Corp. Mr. Brown has been named on two recent patents—one concerned with the manufacture of non-staining reclaim and the other with the mill-strainer. He is a member of the American Chemical Society and the Akron Rubber Group.

William T. Ries has been named production manager of American Cyanamid Co., Calco Chemical Division's Newark plant. He will also continue his present duties as production manager of Calco's rubber chemicals and pharmaceutical departments at the Bound Brook, N. J., plant. Ries joined Calco in 1936 as a trainee and shortly was made a foreman and then superintendent of the company's anthraquinone shop. In 1947 he became general superintendent of Calco's F-Basic department, which produces dyestuffs and pigments and last year was appointed production manager of the pharmaceutical and rubber chemicals department.

John H. Wishnick, superintendent of Witco Chemical Co.'s Chicago plant, has been appointed vice president in charge of production and transferred to Witco's headquarters at 260 Madison Ave., New York 16, N. Y. Mr. Wishnick became plant superintendent at Chicago in 1952, after two years as manager of Continental Carbon Co.'s oil black division at Westlake, La. He is a member of the American Institute of Chemical Engineers, American Chemical Society, and Chemists Club of New York. He also served four years with the Army Air Corps.

William H. Erwin has been appointed international division director in Atlas Powder Co.'s industrial chemicals department and will be responsible for development of chemical sales and operations outside the United States. He previously had headed chemical sales in the company's Wilmington, Del., district, where he is succeeded by **Harry B. Paul.**

William A. LaValley has been appointed advertising and sales promotion manager of The Mansfield Tire & Rubber Co., Mansfield, O., to succeed the late Harry L. Mahoney. LaValley became associated with Mansfield in 1949 as special sales representative covering New York State. He was made a district manager in 1951, assigned to the New York State and New England area.

Miss Elizabeth Bergenn, is one of the newest members of the research staff at the Madison laboratories of Bjorksten Research Laboratories, Inc., Chicago, Ill. Miss Bergenn, who is doing research in the field of polyester resins reinforced with glass fibers, at one time had worked on synthetic chemicals for Celanese Corp. of America.

Charles E. Leyes, technical superintendent of the Newark, N. J., plastics plant of Celanese Corp. of America, has been elected chairman of the Fire Prevention Committee of the Newark Safety Council.

Hugo Skoglund has been signed up by Felt Products Mfg. Co., Skokie, Ill. He previously had been with Diamond Wire & Cable Co.

Frank B. Wolcott has been elected vice president in charge of manufacturing of Wyandotte Chemicals Corp., Wyandotte, Mich., of which he had been general manager of manufacturing.

OBITUARY

Charles Slaughter

AFTER a long illness Charles Slaughter, former president of The Rubber Exchange of New York, Inc., died at his home in New York on October 28. Funeral services were held at the Church of Heavenly Rest, New York, on October 30.

This commodities broker was born in Lynchburg, Va., March 17, 1887.

During 1904-1905 he took academic courses at the University of Virginia, but then decided to forsake college for business.

His first position was as a messenger with Shearson, Hammill & Co., where he later did clerical work in the commodities and stock department. In 1914 he became office manager of W. R. Craig & Co., a stock exchange and commodity firm, and in 1917 he was made a partner in the company, where he remained until 1929, when he organized his own concern, Slaughter, Horne & Co., with principal activities in rubber and sugar. Then in 1947 the deceased became head of Charles Slaughter & Co., which was dissolved in 1950. Mr. Slaughter next acted independently as a commodity merchant and broker.

Mr. Slaughter was one of the organizers of the Commodity Exchange, Inc., which absorbed the Rubber Exchange. He also served as president of the new exchange and on its board of governors and as a vice president, representative for the rubber trade.

During his lifetime he belonged to Delta Tau Delta, University of Virginia and Regency clubs, and India House. He also held membership in the Stock Exchange and various commodity exchanges and associations. During World War II, Mr. Slaughter served as a civilian consultant for government agencies.

Survivors include his mother, the widow, a sister, and a half sister.

CANADA

Price-Fixing Guilty Plea Made by Canadian Firms

Following on the heels of last month's fining of several rubber firms for price fixing,[1] the Canadian Government has successfully completed its case against eight major rubber companies and the Rubber Association of Canada on the same charge of conspiring to fix prices over a 15-year period. The defendants pleaded guilty to the charge and awaited sentence of the court. The Crown prosecutor asked the maximum penalty of $10,000 each to be levied in view of the fact that the companies had maintained "exact, complete, and meticulous control over prices and distribution, destroying every vestige of competition" while enjoying a protective tariff "of never less than 22½%."

In defending the action of the companies, Joseph Sedgwick, counsel for the Rubber Association, described the guilt of the defendants as purely technical, arguing that although agreements may have been made, it is "not proof in itself that the public has been in any way harmed." "Tires of good quality, in ample supply and selling at a fair price" had been produced over this period from 1937-1952, he averred. As further justification of the action of his clients, the RAC lawyer described the time when the agreements were made (1937) as one in which "profits were so lean" that only seven of the 22 tire manufacturers in Canada could survive and he contended that the companies which entered into agreement were fighting to survive and not to become rich.

[1] See our Nov., 1953, issue, p. 244.

The rubber companies pleading guilty to the charge were Dominion Rubber Co., Ltd., Dunlop Tire & Rubber Goods Co., Ltd., Firestone Tire & Rubber Co. of Canada, Ltd., General Tire & Rubber Co., B. F. Goodrich Rubber Co. of Canada, Ltd., Goodyear Tire & Rubber Co. of Canada, Ltd., Gutta Percha & Rubber, Ltd., and Seiberling Rubber Co. of Canada, Ltd.

On November 23, the eight companies and the Association were fined $10,000 each.

Dow Corning Forms Subsidiary

The formation of Dow Corning Silicones, Ltd., a Canadian subsidiary with an authorized capitalization of $450,000 and headquarters in Toronto, Ont., was announced recently by W. R. Collings, vice president and general manager of Dow Corning Corp., Midland, Mich.

Dow Corning's Canadian patents on uses and compositions of organo-silicon compounds are being assigned to the new company. Dr. Collings also reported that the sales personnel of the Dow Corning Products Division of Fiberglas Canada, Ltd., who have been developing the Canadian market for silicone products since 1945, will be transferred to the new company, which expects to be ready to take over the Canadian sales of Dow Corning silicone products next month.

Dow Corning Silicones is erecting a warehouse and office building on a 4½-acre plot in North York Township, 6½ miles from the center of Toronto, at Tibbett Road and the Toronto By-Pass Highway. The Canadian subsidiary, with its experienced personnel and new headquarters including facilities for customer service, is designed, Dr. Collings said, to serve more closely the rapidly growing market for silicone products in almost every segment of Canadian industry. Both industrial and consumer products will be handled by the new company.

Industrial products include: silicone fluids for polishing, dielectric, and damping applications; mold release agents; silicone oils and greases; electrical insulating resins and varnishes; textile finishes; bonding resins; vehicles for heat and weather resistant paints; and Silastic, the Dow Corning silicone rubber. Consumer products include Sight Savers and Sight Saver Cleaning Stations.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Belden Mfg. Co.	Com.	$0.40 q.	Dec. 1	Nov. 17
Boston Woven Hose & Rubber Co.	Pfd.	3.00 semi-an.	Dec. 15	Dec. 1
Brown Rubber Co., Inc.	Com.	0.25 q.	Dec. 1	Nov. 18
Brunswick-Balke-Collender Co.	Com.	0.12½ q.	Dec. 15	Dec. 1
	Pfd.	1.25 q.	Jan. 2	Dec. 21
Carborundum Co.	Com.	0.35 q.	Dec. 10	Nov. 27
		0.35 extra	Dec. 10	Nov. 27
Collins & Aikman Corp.	Com.	0.40 q.	Dec. 1	Nov. 17
Dewey & Almy Chemical Co.	Com.	0.20 q.	Dec. 21	Dec. 11
		0.15 extra	Dec. 21	Dec. 11
Flintkote Co.	Com.	0.50 q	Dec. 10	Nov. 25
		0.50 yr.-end	Jan. 5	Nov. 25
	$4.00 Pfd.	1.00 q.	Dec. 15	Dec. 1
General Electric Co.	Com.	1.00 spec.	Dec. 15	Nov. 17
General Motors Corp.	Com.	1.00 q.	Dec. 10	Nov. 12
General Tire & Rubber Co.	Com.	0.50 q.	Nov. 30	Nov. 20
Goodyear Tire & Rubber Co.	Com.	3% yr.-end	Dec. 21	Nov. 16
	Pfd.	1.25 q.	Dec. 15	Nov. 16
Johnson & Johnson	Com.	0.35 q.	Dec. 11	Nov. 25
	4% Pfd. C	1.00 q.	Oct. 31	Oct. 30
Minnesota Mining & Mfg. Co.	Com.	0.25 q.	Dec. 12	Nov. 21
	Pfd.	1.00 q.	Dec. 12	Nov. 21
National Automotive Fibres, Inc.	Com.	0.50 q.	Dec. 1	Nov. 10
Okonite Co.	Com.	5% stock	Dec. 1	Nov. 16
Phelps-Dodge Corp.	Com.	0.65 q.	Dec. 10	Nov. 19
		0.40 extra	Jan. 7	Dec. 17
Sheller Mfg. Corp.	Com.	0.30 q.	Dec. 11	Nov. 16
United Elastic Corp.	Com.	0.60 q.	Dec. 10	Nov. 18
United States Rubber Co.	Com.	0.50 yr.-end	Dec. 12	Nov. 20
	8% Pfd.	2.00 yr.-end	Dec. 12	Nov. 20

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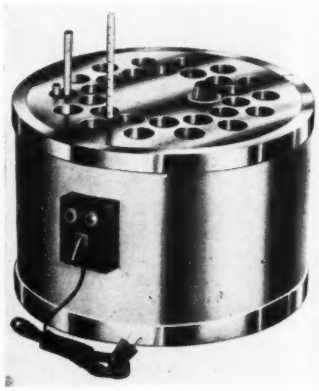
New Machinery

Block Oven for Aging Tests

AN INSULATED solid aluminum block oven, designated the Shelton-Goodrich block heating bath, is being offered by Scott Testers, Inc., Providence, R. I., for use in performing aging tests on rubber, silicones, and other elastomeric materials. Two types are available: the first, designed for test-tube aging in accordance with procedures similar to ASTM Method D-865-52T, contains 28 holes for accommodating 38- by 300-millimeter glass tubes; the second for oxygen-pressure aging (ASTM D-572-52) and for air pressure aging (ASTM D-454-52), contains a lesser number of holes for stainless-steel pressure cylinders.



Model LG Block Heating Bath for Test Tube Aging

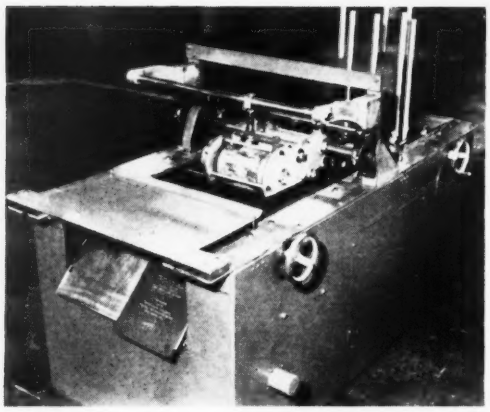
The cavities in the former unit are arranged in two concentric circles; while in the latter case the cavities form only one circle. Individual sample containers may be removed without disturbing samples in the other isolated compartments. The block which contains the cavities and the surrounding insulating material is encased in aluminum sheet. Built-in electrical heating elements and temperature control permit temperatures from 100-450° F. to be attained with variations within ASTM limits. Temperature recorders for these blocks can be supplied at additional cost.

Floor Tile Printer

A MODIFIED version of the Markocoder "3M" imprinting machine, product of Adolph Gottscho, Inc., Hillside, N. J., is being used for printing trade marks and identification copy on floor tiles and similar flat, rigid, and relatively thick objects. The material to be printed is stacked in the machine's magazine, automatically fed one piece at a time to the printing section, and discharged to a tote box or conveyor.

Copy changes on the unit are made quickly and easily by use of interchangeable die wheels. Printing quality obtainable is reported to be sharp, clean, and uniform with fast drying inks of

SEE PAGE 288



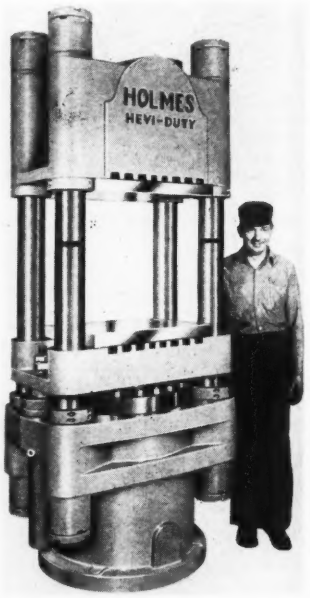
Gottscho Markocoder "3M"

almost any color. The Markocoder "3M" can accommodate objects ranging in area from two by two inches to nine by nine inches and in thickness from 1/16-1/4-inch at speeds up to 60 pieces a minute.

Hevi-Duty Hydraulic Press

A NEW hydraulic press, designed for precision molding of rubber products at high rates, has been announced by Stanley H. Holmes Co., Chicago, Ill. The press platens, which can be heated by electricity or by steam and which measure 24 inches square, can be equipped to furnish working pressures up to 315 tons at 2,000 psi. or 450 tons at 3,000 psi. The ram diameter of the machine is 20 inches, and the distance of stroke travel is 12, 18, 24, or 30 inches.

The press features a series of thermogrooves in the top and the bottom crosspieces, the functions of which are to eliminate the need of insulating material and to maintain direct metal-to-metal contact with the platen. Other features include: chrome-plated rams for smooth movement; prestressed tie rods for positive rigidity of assembly; and overall heavy-duty construction.



Holmes Hydraulic Press

Telescopic Masts for Hand-Trucks

THE availability of quick-acting telescopic masts for use in connecting hand trucks to overhead chain conveyor systems has been announced by Market Forge Co., Everett, Mass. When secured to a truck, the mast can be raised with one hand (in which position it automatically locks) and engaged with a special coupling attached to the chain conveyor. The truck then follows the path taken by the overhead chain. A hinged dog on the coupler prevents the truck from coasting after the chain has stopped moving. The mast can be easily released from the coupling when required, and, in the down position, will not interfere with entrance of the truck into freight carriers.

The new product is recommended for use with the company's load-carrier truck which measures 30 by 48 inches (overall) and is mounted on eight-inch diameter rubber caster wheels. Application of the system to freight handling warehouses was suggested.

New Goods

Goodrich's Riffle Grip Conveyor Belt

Ridged Surface Conveyor Belt

A RUBBER conveyor belt made with a molded rubber ridge surface that sheds the water of the wet material it transports up an incline has been announced by The B. F. Goodrich Co., Akron, O. Called the Riffle Grip, the belt can reportedly be adjusted to retain water with equal ease by changing the inclination angle of the conveyor and of the belt idlers.

The surface ridges stand ⅛-inch high in a series of continuous chevron patterns spaced several inches apart. The conveyed material rests in the center of the belt and proceeds upward as the water flows off the belt edges. The product is reported to have been used successfully in gold dredging operations, in sand and gravel plants, and in dewatering finely ground taconite.

Garden Sprinkler Hose

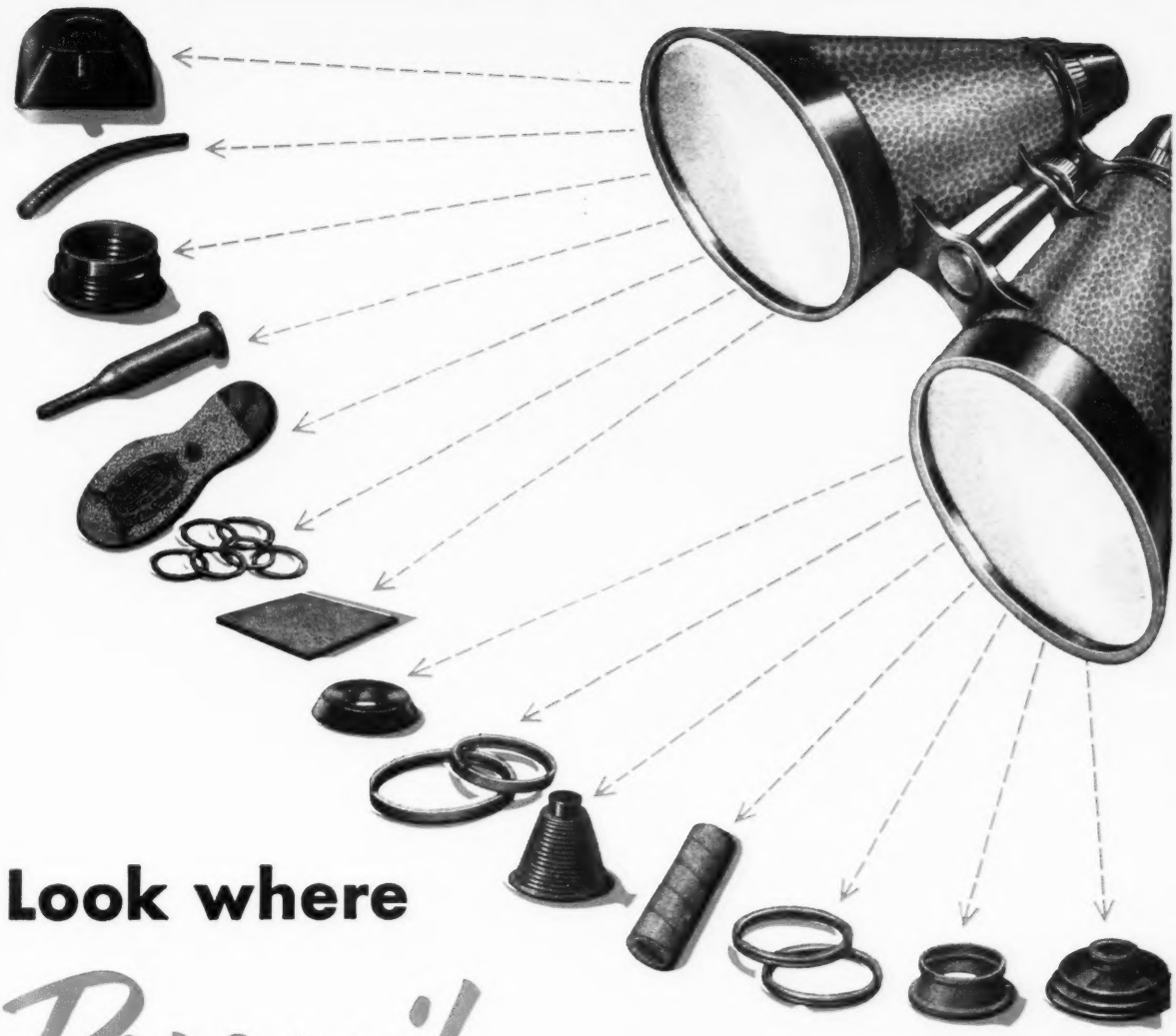
A HOSE-TYPE sprinkler containing four distinct channels, three of which are perforated for spraying, has been developed by United States Rubber Co., Rockefeller Center, New York 20, N. Y., for sprinkling large areas or for soaking small areas. Three channels are located around approximately three-quarters of, with sides common to, the fourth tube, which lies adjacent to the ground for sprinkling. Water is forced along the entire length of the hose through this bottom channel and is reversed in direction (by means of a brass cap) to flow through the perforated tubes for emission.

U. S. Royalite Sprinkler Hose

Known as the U. S. Rovalite sprinkler hose, the unit is equipped with couplings at both ends to permit the addition of extra hose lengths. This hose is made in lengths of 25, 50, and 75 feet and, according to the manufacturer, has the advantage of providing uniform water pressure throughout the entire length.

Rayon Carcass Conveyor Belt

THE New York Belting & Packing Co., Passaic, N. J., has developed a rayon carcass conveyor belt reported to have equal load-carrying capacity, less weight, and a lower stretch factor than the higher priced cotton-duck belts. The new product, called Nyb-Ray, is also claimed to have good troughability, flex life, tear resistance, and fastener-holding ability.



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Paracril® has demonstrated its advantages in a wide variety of rubber products, including high-pressure grease hose—fuel and oil conducting hose—printing rolls and blankets—cements—Signal Corps field carrier cable—pressure flex hose for service at minus 65° F.—coffee maker seal rings—oil field pump valve inserts—aircraft boots and seals—"O" rings—cord shoe soles—and in hundreds of similar applications.

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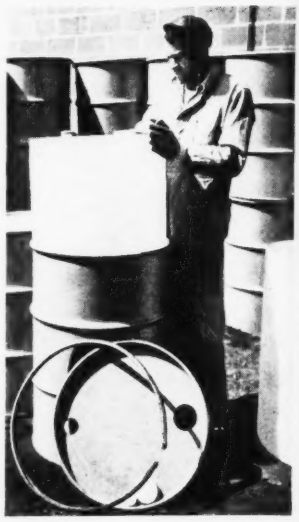
Polyethylene Drum Liners

FLEXIBLE, non-shattering drum inserts designed to fit standard fiber, plywood, and steel overpacks are being molded of polyethylene, product of Bakelite Co., division of Union Carbide & Carbon Corp., New York, N. Y., by Delaware Barrel & Drum Co., Inc., Wilmington, Del. Intended for use in shipping industrial acids and bulk chemicals, the containers with steel overpack are said to be assigned about half the usual freight tariff assessed regular 13½-gallon glass carboys by the Interstate Commerce Commission. This reduced freight cost plus a reported 40% reduction in the cost of the unit makes up the economical advantages to be gained from use of the liners.



Polyethylene Insert Being Assembled into Steel Overpacking

Produced in capacities of five, 15, 30, and 55 gallons, the last-mentioned size weighing about one-fifth as much as the conventional carboy, the drum inserts are molded in one piece with a 1/16-inch thick sidewall and a slightly thicker top and bottom. Construction features include two polyethylene flanges equipped with bottle cap threads on the outer surface to accommodate two-inch and ¾-inch drum plugs.

A cube-shaped five-gallon unit, molded with a two-inch filling and draining opening, is also manufactured for use in a standard corrugated carton.

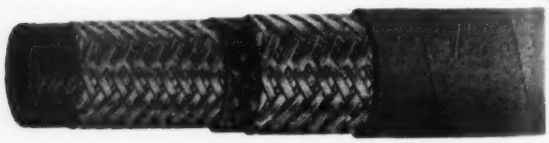
Greater safety in shipping, loading, and storing chemicals is expected from use of the new inserts. The containers are reported to be authorized for use with a steel overpack by the Bureau of Explosives.

Transparent Plastic Tubing

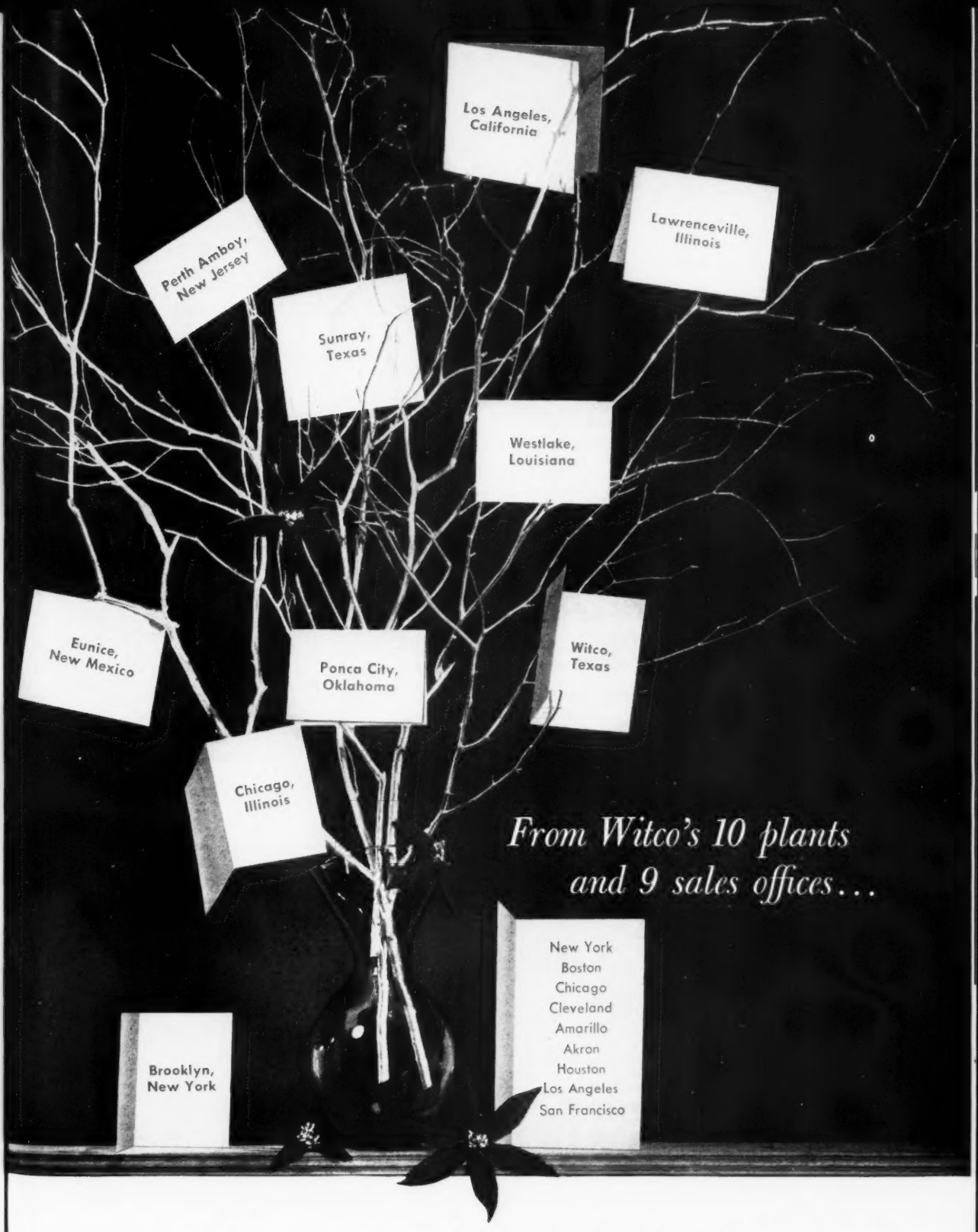
ACE-FLEX, a type of plastic tubing which is reportedly sturdy, flexible, and transparent, has been announced by American Hard Rubber Co., New York, N. Y., for use in piping applications, including connections for glass, metal, and rubber parts. Resistance to most inorganic acids and alkalies and to many organic chemicals is claimed for the product, which is available in standard sizes with inside diameters ranging from 0.120-1 inch. Other characteristics given to describe Ace-Flex include light weight, abrasion resistant, long-life expectancy, and capable of easy cleaning and of steam sterilization.

Flexible Hose for Freon

A LEAK-PROOF, flexible hose, called the Qua-Seal Freon Hose, has been developed by Quaker Rubber Corp., Philadelphia, Pa., for use with freon refrigerant gas. Constructed with two layers of braided textile and a special synthetic tube which is reported to prevent permeation of the volatile gas, the product is claimed to be capable of withstanding the wide temperature range found on both sides of a refrigerator compressor. Specifications include: diffusion rate through hose, 5% less than that experienced with other hose types; maximum working pressure, 400 psi.; and sizes ¼-, ⅜-, ½-, ¾-, and one-inch outside diameter. Use of the new product for transporting other highly volatile solvents and chemicals is also recommended.

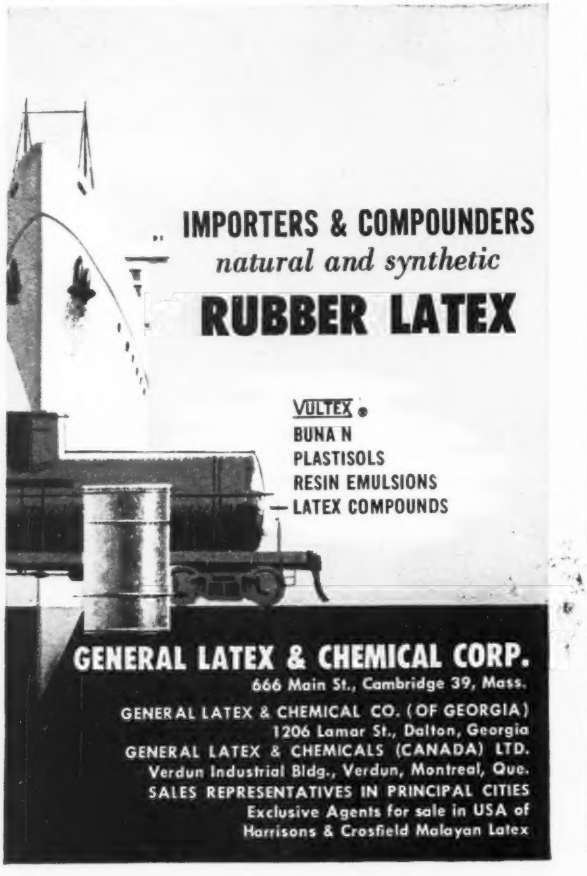


Cutaway Section of Qua-Seal Freon Hose



season's greetings and best wishes for the new year.

Witco Chemical Company
Continental Carbon Company
260 Madison Avenue, New York 16, N. Y.



FAR EAST

MALAYA

A New Thought — Restriction

The outcome of the international rubber talks in London has been generally declared disappointing, and the three proposals of the Rubber Study Group—stockpiling, increased synthetic rubber prices, and accelerated replanting—have come in for much criticism.

The *Straits Times*, exasperated at the futility of the talks, in the opening sentence and concluding paragraph of an editorial of November 2, expresses its opinion of the entire situation. It begins with the statement: "Out of the labors of the Rubber Study Group are born three mice," and winds up:

"New thought is required, for the chances of substantial quantities of rubber going into fresh governmental or commercial stockpiles are slender, the possibility of America increasing the price of synthetic is poor, and the promise of American manufacturers to buy what is surplus is hollow. The Study Group conference has proved to be a sad if salutary disappointment."

Its own stand is that the Group's so-called three-point plan is no plan at all; that it is time the rubber industry's problems became a public issue, and that the government must find a policy or be given one. The *Straits Times* suggests joint restriction by Malaya and Indonesia.

"Orderly and controlled restriction," it says, "which in both countries could be associated with development plans for the increased production of rice, would be infinitely preferable to the decline in production which comes from the abandonment of smallholdings and the closure, after unavailable struggle, of the less efficient estates."

In England, the effect of the failure of the London rubber conference on at least one paper—*Evening Standard*—was, as a Malayan report indicates, an urge to strike out at the United States. It called on the British Government to take action against the United States "attack" on the Malayan rubber industry. The main cause for the state of that industry, it says, is unfair competition from the American synthetic industry.

"Wherever there is a demand for real rubber," it asserts, "it is stemmed and diverted by subsidized synthetic from the United States.

"This has created a surplus of natural rubber. The United States refuses herself to stockpile it. She prevents or limits its export to Russia and China."

Vice President Nixon in Malaya

The vice president of the United States, Richard M. Nixon, on his recent four-day visit to Malaya, had the opportunity of learning something about the situation in the rubber and the tin industries. The Rubber Producers' Council handed him a memorandum in which every aspect of the rubber industry was covered, and it was intimated that methods and means of alleviating the present critical condition rested with the United States, and that positive and immediate action was necessary.

Before leaving the country Mr. Nixon stated his personal belief that not a good price at the moment, but long-term stability of prices in the tin and rubber industries was essential. He understood, he said, that the problem of prices affected not only economic conditions, but also the fight against Communism in Malaya. General Templer had emphasized that about $500,000,000 (Straits) was now being spent annually on this fight, and that much of the money came directly or indirectly from the two industries. All this would be brought to the attention of the American authorities, Nixon promised.

Rubber circles here were not impressed by his statements—some felt that much of it was "hooey"; others greeted them with the indifferent attitude of those who had been through it all before, and few seemed hopeful that they would lead to constructive action.

The representative of one agency house put some unpalatable ideas before Malayan producers. He considered that however much the United States might want to sell the synthetic plants, it was doubtful whether American businessmen would buy them unless they expected to manufacture synthetic below present rates. He felt that Malaya had to face low prices and the elimination of the inefficient; outright competition with synthetic was essential, and bolstering prices to mask synthetic production would be unfortunate.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Low Rubber Prices Hitting Growers

During October, rubber prices dwindled to the lowest levels since the Korean War; on October 29 the price of No. 1 R.S.S. touched 53⅞ cents (Straits currency) per pound.

As prices sagged, the effect became daily more marked, and pessimism more widespread. Offhand one would be inclined to say that before Korea, rubber was selling at much lower figures, and yet Malaya got along. Unfortunately, in Maylaya as elsewhere, operating costs have become much higher. Even with the price at 63 cents a pound, as it was early in October, some of the best-run estates were barely covering costs; with most estates a few cents per pound more or less made the difference between profit and loss; while many others were already working at a loss. As one rubber expert put it at the time, estates were better off six years ago when rubber sold at 35 Straits cents a pound!

Smallholders feel the pinch too; in the beginning of October it was estimated that they took home less than $40 (Straits) a month. Most of the smallholdings are only about four acres, and the poor-quality trees with which they are planted do not yield more than 850 pounds a year, it has been calculated. With No. 1 R.S.S. at 63 cents, smallholders received only 48 cents a pound for their rubber; dealers retain 1½ cents to cover overhead, transport, and commission.

The government listed thousands of rubber holdings of all sizes which were liable to be auctioned off to recover the arrears in rent their owners have not been able to pay. In one state alone, 2,000 lots were so listed; the arrears in this case are running from $1 to $20,000. The three largest estates had acreages of 3,500, 2,700, and 1,700, respectively; many of the lots were over 500 acres, but the majority were 25 acres; the smallest was less than one acre.

Meanwhile a development that is a result of prevailing conditions in the rubber industry and which many would be inclined to welcome is the tendency noted in at least one state for rubber growers to turn to other crops. In Selangor smallholders are making use of a clause in the rubber-replanting scheme which permits recipients of government grants in aid of replanting to grow other crops—coconuts, coffee, padi, pineapples, or orchards—instead of replanting rubber. Many are said to have started growing coffee, which in the past proved very profitable.

A certain amount of changing over seems also to have been started by some estates, which prefer oil-palm as an alternative to rubber.

Wages and Labor

"As a gesture of good will toward workers during a period when they are adjusting themselves to changed circumstances in industry," the Council of the M.P.I.E.A. decided not to call on the Pan-Malayan Rubber Workers' Union to discuss wage cuts from November 1, 1953, as they were entitled to do since the price of rubber had fallen to less than 60 cents a pound. Instead the prevailing wage rates are to be continued to the end of the year so that estate rubber workers in Malaya will not have to take an immediate reduction in pay.

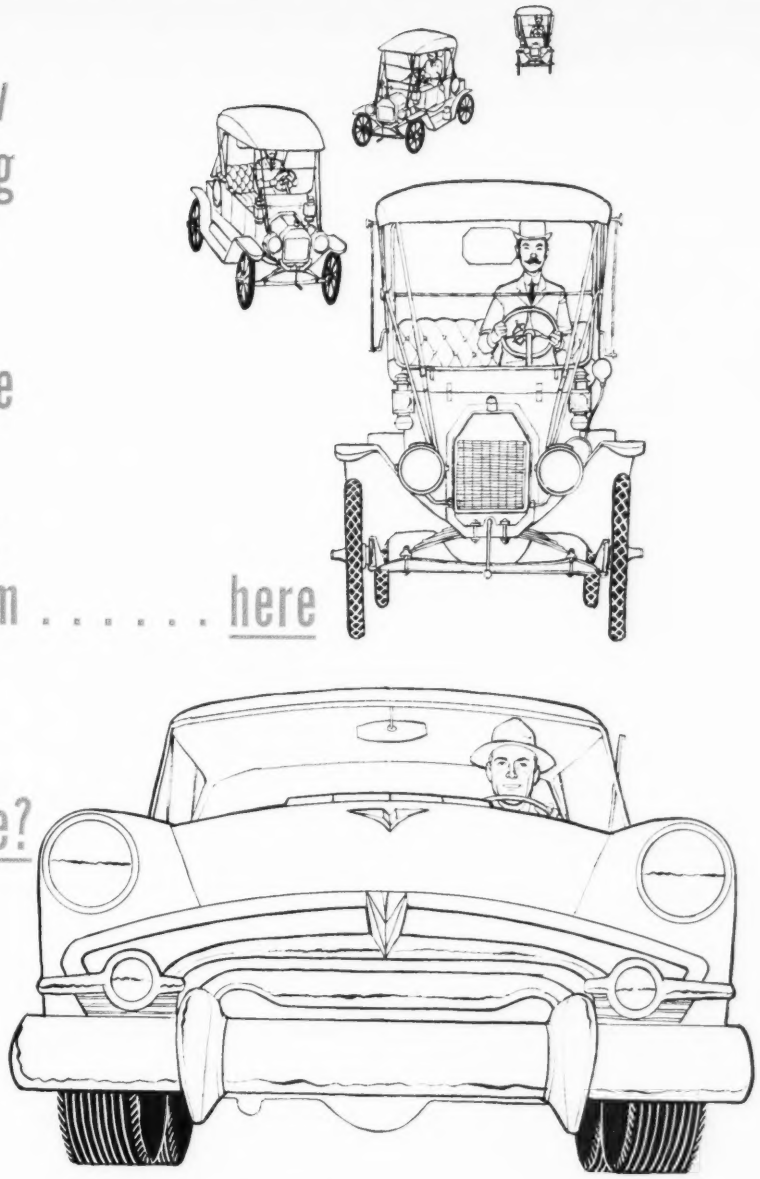
It is to be noted that so far there have been no discharges of labor on estates because of the low prices for rubber, but many estates have increased the size of the tasks in order to get more rubber in and hence more income without increasing overhead—though tappers do get more pay for the extra work. Further economies are in several cases achieved by the doubtful method of cutting out replanting programs.

Imports and Exports

Exports of rubber from Malaya during the first nine months of 1953 totaled 626,027 tons, 52,638 tons less than in the corresponding period of 1952. Dealers' stocks at the end of September came to 45,206 tons, the highest monthly figure of the year.

Rubber shipments from Indonesia to Malaya have fallen steeply in the last two years. Whereas in the first nine months of 1951 they totaled 427,110 tons, they were only 211,623 tons in the 1953 months. The decrease in business, chiefly for Singapore, is the result partly of the desire of Indonesia for direct trade with consuming countries and more recently also of the Republic's efforts to keep domestic remilling establishments fully occupied. Lately a new agency of the Indonesian Government was set up in Palembang to buy up slabs from smallholders and to resell to remilling factories, and in order to insure an adequate supply, the export of rubber for remilling to Singapore has been banned. It is reported that two more remilling works are to be erected, and that not until the offer of slabs exceeds the capacity of the local factories to handle them will it be permitted to export them to Singapore

how long did it take to get from . . . . . here to here?



Answer: 40 years

The average life expectancy of an automobile tire has increased more than 10 times in the past 40 years. In 1909-10, the mileage obtained from tires was about 3,000 miles, contrasted with life today of 30,000 miles and more. Figures now reaching 35,000 are not uncommon, and may even range as high as 50,000 miles, depending on the driver and the condition of the car.

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Preparations to Combat Leaf Blight

A long-range project aiming at the eradication of South American leaf blight is editorially discussed in the September *Planter's Bulletin* of the Rubber Research Institute of Malaya. It is disclosed that three years ago it was decided that since *Dothidella ulei*, the fungus causing this disease, is disseminated by wind, the only plan offering any prospect of successfully combating it, in the unfortunate event that it somehow migrated to Malaya, would be speedy defoliation of a large area around a discovered infection, after which the trees would be kept bare while the infected area itself was cleaned up with fungicides or fire. Tests with a number of defoliants showed the most effective was a hormone-type weed-killer—normal butyl 2,4,5-trichlorophenoxyacetate—dissolved in diesel oil, and other tests indicated that it was best applied by spraying from a plane. Last year the first trial applications were made over old rubber and resulted in almost complete defoliation from only one gallon per acre of oil containing as little as 2% of the hormone. It is figured that one plane could treat 200 acres in a single flight and in an actual spraying time of 10 minutes.

Investigations are continuing in order to find the best dosage for repeated applications and over various terrains, undulating as well as flat.

Rubber Industry Notes

Following the successful laying of a stretch of rubber-asphalt road surface in Penang, the local municipality decided that henceforth rubber powder would be used in all road resurfacing and reconstruction works in that town.

A conveyor belt, 3,000 feet long, 36 inches wide, ¾-inch thick, and said to weigh more than 20 tons, was recently supplied to a local mine by the Phoenix Rubber Works, Hamburg, Germany. This belt is the first exported by the company to Malaya since the war; another, smaller Phoenix belt is also scheduled to arrive in Singapore shortly.

CEYLON

Proposed Revisions to Rubber Laws

Complete revision of the law dealing with the local rubber industry has been urged by the Ceylon Rubber Controller, who proposes a Rubber Control Act to replace all the existing rubber legislation. The act, according to his outline, would provide for (1) the maintenance of up-to-date registers of rubber lands; (2) the collection by the Controller of monthly production statistics from estates; (3) the issuance of permits for the replanting of rubber lands, planting of new land in rubber, and the establishment of rubber nurseries; (4) the issuance of export licenses for shippers, and (5) the licensing of all rubber dealers and the checking of their transactions.

In connection with Provision 3, we note that an average of 1,500 acres of new rubber are being planted annually in Ceylon, despite the recommendation the World Bank mission made in its report on the economic, agricultural, and social development of Ceylon that the area under rubber should not be increased, but rather decreased.

In connection with Provision 5, it may be noted that the number of rubber dealers in Ceylon has grown until there are now said to be about 2,500; everyone seems to be eager to enter the business; in rubber areas even little tea-shopkeepers have become dealers. To reduce their number, the Controller suggests canceling licenses of those dealers whose transactions fall below a specified minimum, also a registration fee for licenses to limit registrations to those really in a position to be good rubber dealers.

More Rubber for Red Satellites

Ceylon and China have come to an agreement on the terms of the rubber-rice contract for 1954, the second year under the five-year pact signed in December, 1952. It is understood China will pay Ceylon 2s. 4d. per pound for sheet rubber, or about 4d. below the 1953 price.

The Chinese take only smoked sheets, and crepe rubber has thus not been sharing in the high prices obtained under the rubber-rice deal. On the contrary crepe, formerly more lucrative

than sheet, is now in the throes of a slump, with prices in many cases down to a level where they barely cover costs of production. Many estates producing crepe are said to have switched over to sheet, and if prices for crepe fall any lower, many more may follow suit or close down. Even if prices are maintained, the position of estates making crepe is likely to remain precarious if—as is foreseen—the rising cost of living, which has been given an added boost by the recent sharp reduction in government subsidies on food, results in demands for higher wages, unless the government grants the request of crepe producers for a cut in the present duty of 15%, or an increase in official prices.

On the other hand, the seemingly widespread changeover to sheet is already said to be causing concern over the possibility that Ceylon may find itself with a rubber surplus at the end of the year.

But again a Communist country is preparing to act the role of rescuer of Ceylon crepe and sheet rubber both. Reports from Colombo state that Czechoslovakia has been showing marked interest in purchases of crepe rubber. In September a Czech delegation arrived in Ceylon offering to buy crepe rubber at higher than world market prices, and also other types of rubber, besides coconuts, coconut oil, and bristles. The Czechs also want facilities for Czech businessmen to visit Ceylon to contact local businessmen. At last reports negotiations were understood to have been started and to be progressing favorably.

It seems that Soviet Russia would also like to deal direct with Ceylon for rubber, but she has very little to offer in exchange. Meanwhile she appears to be getting some of the Ceylon rubber sold to Communist China; a supposition which a Tokyo press announcement would confirm. According to this source, Russia and Communist China on August 30, 1953, signed a 10-year trade agreement under which the latter will supply foodstuffs and agricultural and mineral products and will also sell up to 45% of the rubber bought from Celyon under the rubber-rice pact to Russia. In exchange that country would lend China £125,000,000 to buy Russian heavy machinery and industrial equipment and, in addition, would undertake to send skilled technicians and managers to China, besides training Chinese technicians in Russia.

AUSTRALIA

Recent reports from Australia indicate that while the rubber trade had been adversely affected by a sharp decline in registration of automobiles since 1950, improvement was noted in the latter half of 1953, and the outlook is considered good. The country has been importing natural rubber at the rate of about 35,000 tons annually, 80% of which goes into tires, and the rest chiefly into mechanical goods and rubber hose.

There are said to be about 80 factories here wholly or partly devoted to rubber products other than tires. In addition Australia has 300 tire retreading and repair establishments.

Redfern's Rubber Works, Ltd., Hyde, Cheshire, and Empire Rubber Co., Dunstable, both in England, have jointly acquired interest in the Associated Rubber Pty. Ltd., a small but progressive firm in Melbourne. Each company has invested £20,000

SEE PAGE 288

in the concern, making a total of £40,000, equivalent to £A.50,000, which sum is to be used to provide additional capital for development. The two British companies will also contribute technical know-how and experience.

Olympic Cables Pty. Ltd., Melbourne, is adding the manufacture of paper-insulated lead-covered cables to its other lines and to this end has built a new section at its factory at Footscray, outside Melbourne. Almost all the machinery required is made in Australia. The latest addition enables Olympic to produce practically every type of cable known.

A majority interest in Molded Hair of Australia, Ltd., has recently been acquired by Latex Products Pty. Ltd., Melbourne, a wholly owned subsidiary of Dunlop Rubber (Australia), Ltd. Latex foam products will continue to be developed here and sold under the "Texfoam" trade mark.

The Goodyear Tire & Rubber Co. (Australia), Ltd., reportedly spent £A.1,000,000 to increase plant capacity, including a new plant where it is intended to produce conveyor belts, hose, and other mechanical goods.

INDONESIA

For some time frequent reports arose of the intention of the Indonesian Government to sell rubber to China, but these were denied. Now, however, the Indonesian Government itself has announced that it will send a trade mission to China to discuss rubber.

The Minister of Agriculture stated that the Chinese were ready to buy Indonesian rubber and added that his country's dependence on the United States in regard to rubber was thus about to end. The local press was apparently cool to the announcement, which, however, did not prevent criticism of the American Government, accused of putting economic pressure on the Indonesian Government to compel a change in policy.

Doubt over the possibilities of rubber trade with China is expressed by some, who do not seem to think this business worth risking American interests.

The *Straits Times*' suggestion that Malaya and Indonesia get together on a rubber restriction scheme was featured in a local paper, and it also seems to have caught the attention of the Agriculture Minister, who did not lose the opportunity of reverting to it in his talk on the projected China rubber trade. The sending of a trade mission to China to arrange for an agreement on sale of rubber, was called a "tactical error" by rubber experts in Amsterdam, Holland, Far Eastern papers learn. They are also said to have considered that talk of restriction was unimportant, at least for the present. Even today, it was pointed out, Indonesian control of rubber exports was so defective that much rubber was being smuggled. With no efficient methods of supervision, it was concluded, restriction would harm bona fide producers and benefit smugglers; and the prospects of immediate cooperation between Malaya and Indonesia in a restriction agreement were not considered very bright.

EUROPE

FRANCE

Views on Copenhagen Meeting

Various writers,[1] discussing the recent meeting of the Rubber Study Group in Copenhagen, stress its rather negative outcome, but draw provocative conclusions from what took place. The items have this in common—on the one hand they are skeptical about American optimism on continued high consumption of rubber, and, on the other, are doubtful that the passing of the American synthetic rubber industry from government control will be followed by any significant rise in the price of synthetic rubber, as is hopefully expected in some quarters. One commentator foresaw a monopolistic trend and drew on figures given in an editorial in the April, 1953, issue of Indian Rubber World, on the "Future Pattern of the Synthetic Rubber Industry," to show that while the "pattern" might have the effect of limiting the possibility of competition among the participating firms themselves and with newcomers, it might also in the future limit the chances

[1] See June, 1953, *Rev. gén. caoutchouc.*

of natural rubber on a market entirely dominated by a very small number of big concerns, which in 1953 would have divided among themselves practically the entire means of producing GR-S in the United States, prorated, so to speak, on the volume of their business in 1952.

Another writer urges that the producers of natural rubber must realize that they have nothing to rely on but their own efforts; that they cannot count on the possibility of increased prices of synthetic rubber or on a decrease in its production to help them; that in the coming struggle, only those will survive who are able to reduce their costs to a level permitting them to compete with synthetic rubber; and that rejuvenation of plantations will be essential factors in this connection, with improvement of quality hardly less important.

In his article, "The Lesson of Copenhagen," François Herbette warns planters to beware of accepting the view that the position of American rubber consumers and synthetic rubber producers is impregnable, or that the United States offers an unlimited market for cheap rubber. With regard to the former, he holds that no position should be considered impregnable so long as serious concerted effort has not been made to take it. At Copenhagen, moreover, planters failed to unite in strongly pressing the point that the problem of supplying the United States with cheap, plentiful rubber involves the development of such economical conditions as will insure the rubber countries of southeast Asia more than a bare living from their trade with the Western Hemisphere—if America is really anxious to further their progress and secure their friendship. As for the latter, while not doubting the sincerity of the optimism of the American delegates, Herbette points to the "obvious flaw" which should deter the planters from sharing the rosy view of their customers, and that is that the prosperity of the American rubber industry is closely related to the almost uninterrupted boom in the American automobile industry in the last five or six years.

"How long can this boom last?" he asks.

Testing Cellular Materials

In aviation construction cellular materials: cellular hard rubber, Moltoprene, Klegecell, and the like, are used chiefly as cores in sandwich panels serving as doors, partitions, and flooring, for soundproofing and heat-insulating cabins, and for filling empty spaces to reduce vibration and increase rigidity and insubmersibility.

The various tests to determine the mechanical properties, aging, resistance to fire, heat, variations in pressure, solvents, of such cellular materials, have been reviewed by B. Persoz,[1] who concludes that much still remains to be done in the way of creating new testing methods and means and also new materials. He points to various gaps in present methods and lacks in regard to apparatus: no study has yet been made of the effect on the mechanical properties of distribution and size of diameters of cells; no machines exist for indicating damping capacity, or for tracing effort-deformation cycles for various frequencies and various temperatures.

As to new materials, he reasons, if compact nylon has better properties than compact ebonite, the same should hold true for the expanded form of these materials. The chemical inertness of polythene, the heat resistance of the silicones, the damping capacity of polyesters, are all properties which should also be present in the cellular forms of these materials.

[1] *Rev. gén. caoutchouc*, 30, 7, 492 (1953).

GREAT BRITAIN

Arrangements have been made for the manufacture of Kosmos and Dixie grades of furnace black by United Carbon Black, Ltd., Swansea, England, and United Carbon Co., Charleston, W. Va., U.S.A. The English firm will have available the technical knowledge and experience of the American company for the purpose of establishing standards and insuring control of quality.

Modifications of the existing Swansea plant and process are under way, and expansion of the facilities is planned. As a result of these modifications, the general-purpose furnace black to be produced will be marketed with the suffix 45 for purposes of differentiation.

A modern plant for the manufacture of latex compounds, auxiliary chemicals, adhesives, wax and rosins, and certain types of lubricants and emulsions has been acquired by Witco Chemical Co., Ltd., at Union Lane, Worcs.

Editor's Book Table

BOOK REVIEWS

"Chemistry of Carbon Compounds. Volume II, Part A: Alicyclic Compounds." Edited by E. H. Rodd. Elsevier Publishing Co., 402 Lovett Blvd., Houston, Tex. Cloth, 6 by 9 inches, 510 pages. Price, $12.50.

This second of a five-volume set covers the chemistry of non-aromatic carbocyclic compounds and is divided into two parts, of which this is the first. This book consists of 11 chapters. The first is an introduction to the subject; while the other chapters are devoted to the chemistry of alicyclic compounds of increasing complexity. The first nine chapters, contributed by R. A. Raphael, cover the following topics: introduction; cyclopropane group; cyclobutane group; cyclopentane group; cyclohexane group; cycloheptane, cyclo-octane, and macrocyclic groups; polynuclear alicyclic compounds with separate ring systems and spiro compounds; polynuclear alicyclic comopunds with condensed cyclic systems; and bridged ring systems. The remaining chapters and their contributors are: "The Carotenoid Group," R. F. Hunter; and "Open-Chain and Cyclic Polymers Derived from Olefinic Compounds; Rubber and Rubber-Like Compounds, Natural and Synthetic, and Their Derivatives," by R. G. R. Bacon. Features of the book are the many literature references given throughout the text, and the comprehensive subject index.

"Organic Analysis." Volume I. Edited by John Mitchell, Jr., I. M. Kolthoff, E. S. Proskauer, and A. Weissberger. Interscience Publishers, Inc., 250 Fifth Ave., New York 1, N. Y. Cloth, 6 by 9 inches, 481 pages. Price, $8.50.

This is the first volume of a new series to cover the field of organic quantitative non-elemental anlysis, a subject usually covered inadequately in the formal education of industrial organic and analytical chemists. Prepared with the assistance of an advisory board of 22 specialists in the field, the series will present a review of current knowledge of non-elemental analysis and critical evaluations of the procedures employed.

This first volume, dealing with functional group analysis, consists of nine contributed chapters, as follows: "Determination of Hydroxyl Groups," V. C. Mehlenbacher; "Determination of Alkoxyl Groups," A. Elek; "Determination of the Alpha-Epoxy Group," J. L. Jungnickel, E. D. Peters, A. Polgar, F. T. Weiss; "Organometallic Compounds for the Determination of Active Hydrogen," G. F. Wright; "Diazomethane for the Determination of Active Hydrogen," F. G. Arndt; "Determination of Carbonyl Compounds" and "Determination of Acetals," Mitchell; "Determination of Organic Sulfur Groups," S. D. Nogare; and "Spectroscopic Functional Group Analysis in the Petroleum Industry," N. D. Coggeshall.

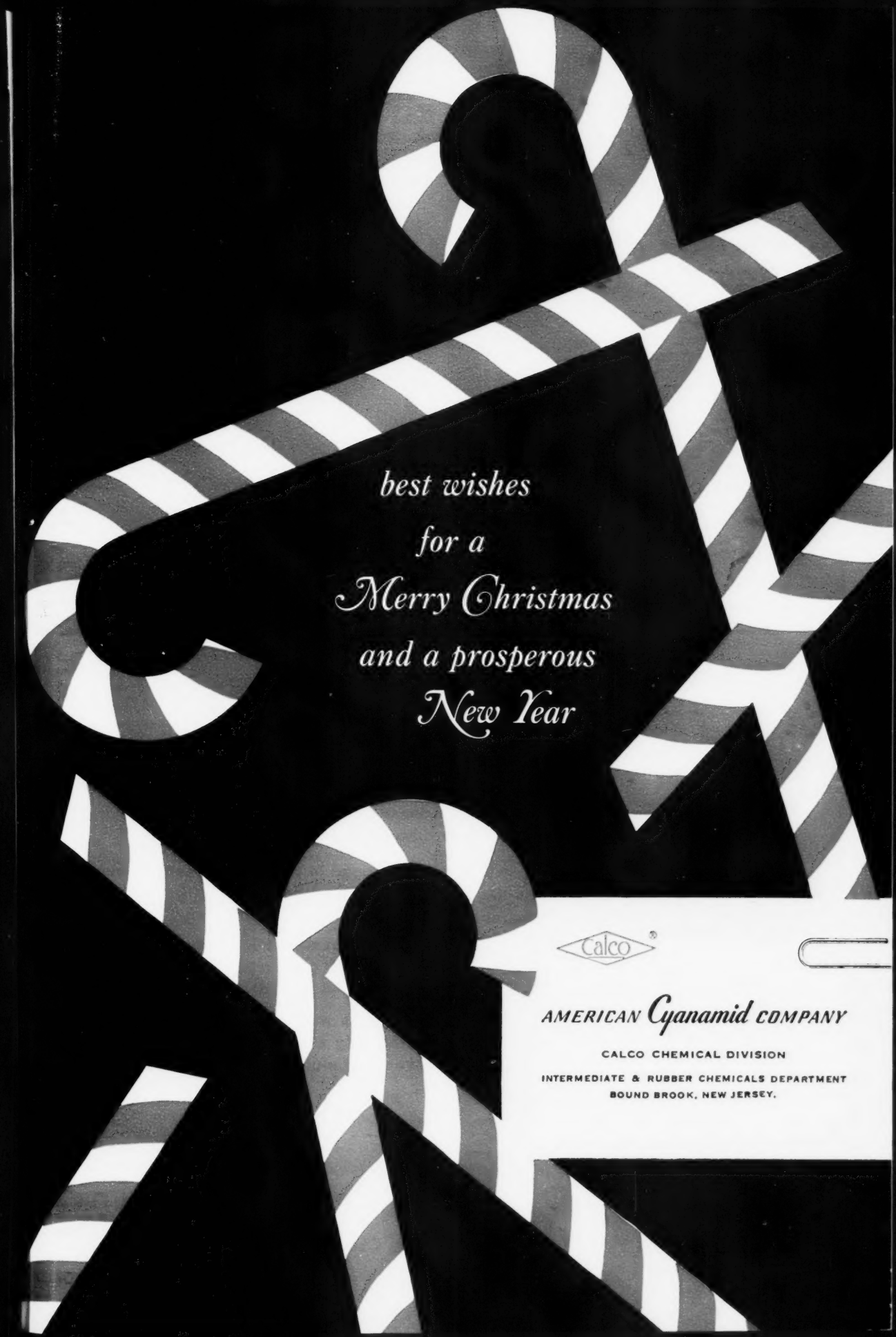
NEW PUBLICATIONS

"Giffels & Vallet, Inc., L. Rossetti: Engineers—Architects." Detroit, Mich. 72 pages. A pictorial review of projects completed by the firm, with an organizational chart describing the various functions of each department, are contained in this attractive publication.

"Specifications for X-758." November 1, 1953. Reconstruction Finance Corp., Office of Synthetic Rubber, Washington 25, D. C. 1 page. This insert is intended for inclusion in "Specifications for Government Synthetic Rubbers"—Revised Edition, October 1, 1952. The physical properties of the polymer are described.

"Specifications for GR-S 1018." 11-1-53. 1 page. This sheet also is intended for inclusion in "Specifications for Government Synthetic Rubbers," to supersede that dated 7-17-53.

"Bibliography on Sequestrene." "What's Doing." No. 3. Alrose Chemical Co., Providence, R. I. 8 pages. This publication covers the 1952 literature on Sequestrene (ethylenediamine tetraacetic acid) and other papers not covered in the first such bibliography published by the firm.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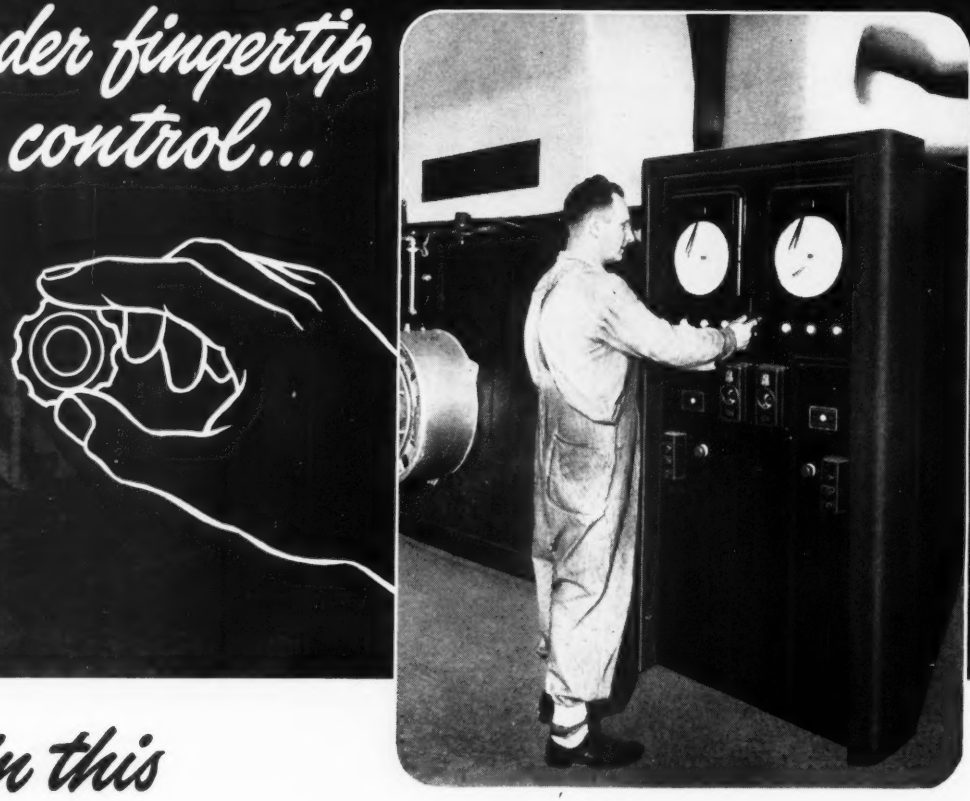

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Publications of Dow Corning Corp., Midland, Mich.

"Silastic Facts." No. 9-332. 3 pages. Silastic 675,[1] a silicone rubber molding compound, is described by properties, applications, and curing data.

"Silastic Facts." No. 9-333. 2 pages. The properties and applications of Silastic 132,[1] a silicone rubber paste for coating cloth, are contained.

"1953-54 Reference Guide to Dow Corning Silicone Products." 4 pages. The most important properties of some of the more widely used silicones are briefly given in this publication.

[1] See India RUBBER WORLD, Nov., 1953, p. 254.

"RPA No. 6." Report No. 53-2. J. L. Hartman and D. B. Forman, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. 10 pages. The properties of this plasticizer[1] and test results involving its use in both natural and GR-S rubbers are contained in this booklet.

"Neoprene Notebook." No. 57. Du Pont. 8 pages. Contained in this bulletin, in addition to some neoprene product applications, is part IV of the series, "The Language of Rubber," in which permanent set, stress, and strain relaxation characteristics of rubber are described.

[1] See p. 357.

"Rubber Flooring Clip Sheet." September, 1953. The Rubber Mnufacturers Association, Inc., 444 Madison Ave., New York 22, N. Y. 1 page. Suggestions for the choice, installation, and care of rubber floor tile are given in this publication.

"Vulcan 3, Vulcan 6, and Vulcan 9 in Natural Rubber." Technical Service Laboratory Bulletin No. GD-6. B. B. S. T. Boonstra, C. W. Gnerre, and T. D. Bolt. Godfrey L. Cabot, Inc., 77 Franklin St., Boston, Mass. Natural rubber was compounded with 35, 40, 45, and 50 parts of each of these SAF blacks, and the physical properties of the resulting materials are described herein.

"Product Bulletin." PD-B-1. Allied Chemical & Dye Corp., New York, N. Y. 4 pages. Biuret, a compound similar to urea and melamine in application possibilities, is discussed, with chemical and physical properties, reactions, and suggested applications given. A two-page literature reference appendix is included.

"Engineering News." Bulletin SK-2, Vol. 5, No. 1. Schutte & Koerting Co., Cornwells Heights, Pa. 6 pages. The company's testing equipment, techniques, and quality control system, all of which are used in the production of high-pressure, high-temperature equipment, are discussed in this catalog insert.

"Hycar Technical Newsletter." Vol. 2, No. 10. B. F. Goodrich Chemical Co., Rose Bldg., Cleveland, O. 6 pages. Covered in this issue of the "Newsletter" are Hycar and di-ester lubricants, and sulfur dispersions in Hycar compounds.

"Pick Your Toughest Hauling Jobs." B. F. Goodrich Co., Akron, O. 24 pages. This booklet illustrates a variety of off-the-road tires operating on equipment involved in logging, construction, and strip mine and quarry service.

"Paracril Nitrile Rubbers." Technical Bulletin No. 7. Naugatuck Chemical Division of United States Rubber Co., Naugatuck, Conn. 44 pages. The physical properties of the rubbers resulting from compounding and processing with various types of carbon black are contained in this bulletin.

"BWH Industrial Rubber Products: Belting." Boston Woven Hose & Rubber Co., Cambridge, Mass. 50 pages. This brochure contains technical data information of both general and engineering classifications on the company's transmission, conveyor, and elevator belting.

"Plastics: Everything a Woman Could Ask for." *McCall's Magazine*, Dayton, O. 10 pages. Paper, 25¢. Intended as a consumer buying guide, the booklet describes nine basic kinds of plastics used in home furnishings. The publication is based on a September home furnishing article in the magazine which was produced in cooperation with the Society of Plastics Industry, Inc.

"Ketones." F-4767. Carbide & Carbon Chemicals Co., a division of Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y. 46 pages. The 14 ketones manufactured by the company, their uses, physical properties, specifications, shipping data, and constant boiling mixtures are discussed. Also contained are a bibliography on these ketones, and the specification test methods used by Carbide.

"Scientific Research and Development in American Industry—A Study of Manpower and Costs." Bulletin No. 1148. United States Department of Labor, Bureau of Labor Statistics, in cooperation with United States Department of Defense, Washington, D. C. 114 pages. Available from Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Price 50¢. This is a comprehensive and detailed report on industrial research resources in the United States. Nearly 2,000 companies, with research programs costing almost $2 billion in 1951, were included. The average cost per research engineer or scientist was $21,900 in 1951, and the average cost per research worker was $8,800. Other topics discussed in the report include the rate of turnover of professional research staffs and the effects of military calls of such employes, research costs as percentage of sales, and the extent of increase in government sponsored research between January, 1951, and January, 1952. Detailed information on the rubber products industry is found in the many tables of data included.

"Automobile Facts and Figures." 33rd Edition, 1953. Automobile Manufacturers Association, Detroit, Mich. 80 pages. Interesting information on cars, trucks, and busses are contained.

"Decorative Treatments for Lustrex Styrene Plastic." Product Information Bulletin No. 86. Monsanto Chemical Co., Springfield, Mass. 32 pages. This publication, which supersedes PIB No. 62, deals briefly with design considerations and in much detail with the lacquering, metalizing, printing and hot-stamping, and destaticization of styrene plastic articles.

"Kaleidoscope." Vol. 1, No. 1. Rubber Age & Synthetics, Ltd., 147 Grosvenor Rd., Westminster, London, S.W.1, England. 12 pages. Annual subscription, 24/-. This publication, the first issue of a monthly news-letter, is the outgrowth of a two-page section of political, financial, and technical news items concerning the rubber and plastics industries which had previously appeared as a department of *Rubber Age & Synthetics*. According to the editor, this new method of supplying information was necessitated by the abundance of technical articles being presented in the journal.

"Chemicals for Industry and Agriculture." Consolidated Chemical Industries, Inc., New York, N. Y. 102 pages. This catalog, published in commemoration of the firm's seventy-fifth anniversary, contains an account of the company's history and growth and describes the products with specifications, technical data, and packaging-shipping information.

"Ethyl Cellulose in Specialty Coatings." Hercules Powder Co., Wilmington, Del. 16 pages. The compositions of lacquers containing this compound, including the solvents and stabilizers used, for various applications on surfaces of rubber, plastics, etc., are described in this brochure.

"Recruiting the College Graduate: A Guide for Company Interviewers." R. S. Uhrbrock. American Management Association, 330 W. 42nd St., New York 36, N. Y. 32 pages. Paper, $1.25. The concepts which are believed to be important as criteria in choosing employes are discussed, and methods by which the interviewer can obtain such information from the candidate are considered in detail.

"Metablast—The Liquid Abrasive Surface Treatment." American Metaseal Mfg. Corp., West New York, N. J. 4 pages. The process by which finishes can be applied to metal parts through the use of a special abrasive suspension applied to parts by air pressure is discussed and illustrated in this booklet.

"Rolls for Industrial Use." Catalog No. 48. Rodney Hunt Machine Co., Orange, Mass. 60 pages. This wire-bound, illustrated publication covers the specifications, properties, and applications of the firm's metal, rubber, wood, and plastic rolls.

"Physical Properties of Synthetic Organic Chemicals." 1954 Edition. Booklet F-6136. Carbide & Carbon Chemicals Co., 30 E. 42nd St., New York 17, N. Y. 20 pages. Data on applications and physical properties of more than 330 products, 36 of which are new chemicals, manufactured by the company are contained in this brochure.

"Armstrong Pure Foam." Armstrong Rubber Co., West Haven, Conn. 12 pages. The various stages involved in the production of foam rubber at the company's plant in Norwalk, Conn., are described and illustrated in this booklet in a manner similar to that in which the same subject was treated in the July issue of *The Vanderbilt News.*

"Studies in Centralized Lubrication, 1953." Farval Corp., Cleveland, O. 8 pages. A description of the company's lubricating system and various applications in which it has been used are covered in this bulletin.

"Equipment for the Electronics Industry." Booklet B-6093. Westinghouse Electric Corp., Pittsburgh, Pa. 16 pages. Descriptions, applications, and operating ranges of electronic equipment made by the company are given.

"Bakelite Vinyl Dispersion Resins for Organosols & Plastisols." Booklet VE. Bakelite Co., 300 Madison Ave., New York 17, N. Y. 8 pages. Typical uses, properties, and methods of applying the resin-base organosols, plastisols, and plastigels are presented in this illustrated booklet.

"How to Get Extra Service out of Solid Industrial Tires." The Rubber Manufacturers Association, Inc., 444 Madison Ave., New York 22, N. Y. 8 pages. This illustrated booklet discusses the more common reasons for failures and suggests preventative measures to be taken by the user.

"Royalite Resinoid, High-Speed Grinding Wheels." August 3, 1953. United States Rubber Co., Fort Wayne, Ind. 16 pages. This booklet is a simplified net pricing schedule covering straight side wheels, cups and cone wheels, and special shapes.

"Koroseal Upholstery." B. F. Goodrich Co., Marietta, O. 12 pages. The applications to which Koroseal material is put in this respect are illustrated in this publication.

Publications of Underwriters' Laboratories, Inc., Chicago, Ill. **"Bi-Monthly Supplement to Lists of Accident Equipment, Automotive Equipment, Burglary Protection Equipment, Electrical Equipment, Hazardous Location Electrical Equipment, Fire Protection Equipment, Gas and Oil Equipment."** April, 1953; June, 1953; August, 1953. 96, 80, and 104 pages, respectively. **"Accident, Automotive, and Burglary Protection Equipment Lists."** September, 1953. 122 pages. **"Wasted: $3 Billions Yearly—We Can't Afford It."** Automobile Manufacturers Association, Detroit, Mich. 20 pages.

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SEE PAGE 288

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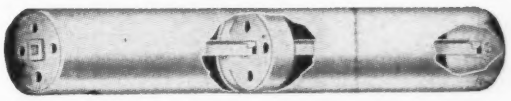

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MARKET REVIEWS

RUBBER

MODERATE activity and price fluctuations within a relatively narrow range were noted on both the rubber spot and futures markets during the period from October 16 to November 15. On the spot market, offerings from the Far East were in fair volume, and factory buying continued to be made on the price downswings. In general, prices showed a firming tendency and, coupled with some strength in the foreign markets, served to attract buying by the smaller rubber manufacturing firms.

NEW YORK SPOT MARKET
WEEK-END CLOSING PRICES

	Sept. 26	Oct. 17	Oct. 24	Oct. 31	Nov. 7	Nov. 14
R. S. S.						
#1	22.88	20.88	20.63	20.75	20.63	20.50
2	22.13	20.00	19.75	20.00	19.88	19.75
3	21.25	19.00	18.75	19.00	18.88	18.75
Latex Crepe						
#1 Thick	28.00	27.25	25.00	25.38	25.25	25.50
Thin	24.88	24.00	23.00	23.00	22.75	22.88
#3 Amber						
Blankets	19.38	17.50	17.00	17.00	16.88	16.75
Thin Brown Crepe	18.50	16.75	17.13	16.13	16.13	16.00
Flat Bark	17.25	15.75	15.25	15.25	15.13	15.00

The spot price for #1 Ribbed Smoked Sheets started the period at 20.88¢, rose to a high of 21.00¢ on October 19, fell to a low of 20.13¢ on October 20, 27, 28, and November 2, and closed at 20.50¢ on November 13. October monthly average spot prices for certain grades were as follows: #1 R.S.S., 20.94¢; #3 R.S.S., 19.16¢; #3 Amber Blankets, 17.40¢; and Flat Bark, 15.77¢.

COMMODITY EXCHANGE
WEEK-END CLOSING PRICES

Futures	Sept. 26	Oct. 17	Oct. 24	Oct. 31	Nov. 7	Nov. 14
Mar.	22.65	20.65	20.50	20.60	20.50	20.40
May	22.60	20.65	20.50	20.50	20.60	20.35
July	22.60	20.65	20.50	20.50	20.60	20.35
Sept.	22.60	20.65	20.55	20.55	20.60	20.35
Dec.	22.60	20.65	20.55	20.55	20.60	20.35
Total weekly sales, tons	2,060	1,570	1,460	1,900	1,810	770

Activity and price movements in rubber futures trading on the New York Commodity Exchange followed the lead of the spot markets, with most interest centered in the March, May, and July deliveries. March futures started the period at 20.65¢, reached a high of 20.75¢ on October 19, fell to a low of 19.80¢ on November 2, and closed the period at 20.40¢. Sales of rubber futures during the second half of October amounted to 3,400 tons, making a total for the month of 9,190 tons. Sales during the first half of November were 2,590 tons.

Latex

A SIGNIFICANT improvement in demand for *Hevea* latex took place during the period from October 16 to November 15. After having been in a depressed condition for a few months, demand took an upswing in November to the point where consumers and importers who had cut back their holdings began to find themselves short of latex. ASTM centrifuged latex, which had sold for 27.5¢ a pound, dry solids, into the first half of 1954, rose to 28.5-29.5¢ a pound. Should the improved demand keep up, a period of relative famine can be expected in the immediate future until supplies can be imported and built up once again.

Final August and preliminary September domestic statistics on natural and synthetic rubber latices are given in the following table:

(All Figures in Long Tons, Dry Weight)

	Production	Imports	Consumption	Month-End Stocks
Natural latex				
Aug.	0	6,649	5,203	10,273
Sept.*	0	6,000	5,574	11,337
GR-S latices				
Aug.	3,058	91	3,576	5,081
Sept.*	3,449	69	3,717	4,906
Neoprene latex				
Aug.	753	0	670	1,127
Sept.*	778	0	648	1,138
Nitrile latices				
Aug.	633	0	343	617
Sept.*	582	0	320	656

*Preliminary.

SCRAP RUBBER

TRADING in scrap rubber continued at a slow pace during the period from October 16 to November 15. Orders received for November delivery were at substantially lower tonnages than for October, and the outlook for the near future does not indicate any significant improvement in demand for scrap rubber. Some resentment was aroused by one reclaimer whose purchases of mixed auto tires in November specified a minimum of 35% truck and bus tires instead of the previous 30% requirement. In view of the higher percentage of truck and bus tire scrap, dealers believed that some adjustment should be made of the purchase price, which remained unchanged.

Following are dealers' selling prices for scrap rubber, in carload lots, delivered to mills at the points indicated:

	Eastern Points	Akron, O.
	(Per Net Ton)	
Mixed auto tires	$11.00	$12.00
S. A. G. auto tires	Nom.	Nom.
Truck tires	Nom.	15.00
Peelings, No. 1	40.00	40.00/42.00
2	Nom.	24.00
3	14.00/15.00	Nom.
	(¢ per Lb.)	
Auto tubes, mixed	2.00	2.25
Black	3.25	4.00
Red	9.75	10.00
Butyl	1.75	2.00

RECLAIMED RUBBER

A FURTHER decline in demand was noted in the reclaimed rubber market during the period from October 16 to November 15. Much of this reduction in demand stemmed from cuts in the production schedules of tire manufacturers because of model changeovers now in progress in the automotive industry. An improvement in demand for reclaim should be noted after the first of the year when automotive production is expected to return to normal levels.

Final August and preliminary September statistics on the domestic reclaimed rubber industry are now available. Totals for August, in long tons, were: production, 22,532; imports, 75; consumption, 22,666; exports, 838; and month-end stocks, 30,318. Preliminary figures for September, in long tons, follow: production, 23,340; imports, 183; consumption, 22,181; exports, 823; and month-end stocks, 30,238.

There were no changes in reclaimed rubber prices during the period, and current prices follow:

Reclaimed Rubber Prices

	Lb.
Whole tire: first line	$0.10
Fourth line	.0875
Inner tube: black	.15
Red	.2425
Butyl	.125
Pure gum, light colored	.2425
Mechanical, light colored	.135

The above list includes those items or classes only that determine the price basis of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

COTTON FABRICS

ACTIVITY in the cotton industrial fabrics market was limited during the period from October 16 to November 15, continuing the trend of recent months. Curtailments in production have been taking place gradually in such fabrics as wide sateens, broken twills, and wide drills as mills endeavor to keep production in balance with demand. These curtailments have not as yet resulted in any significant tightening of supplies, and most constructions are readily available for spot shipment.

A steady, although moderate, demand for hose and belting ducks was noted for nearby delivery. Trading in flat ducks continued to be on a hand-to-mouth basis, and purchases of drills, sheetings, and sateens consisted only of small fill-in lots needed by coaters to meet immediate requirements. Prices throughout the market period showed little change, and there are no indications of any large-volume buying in the near future.

Cotton Fabrics

Drills		
59-inch 1.85-yd.	*yd.*	$0.375
2.25-yd.		.335
Osnaburgs		
40-inch 2.11-yd.	*yd.*	.2425
3.65-yd.		.16
Ducks		
38-inch 1.78-yd. S. F.	*yd.*	nom.
2.00-yd. D. F.		nom.
51.5-inch, 1.35-yd. S. F.		nom.
Hose and belting		.64
Raincoat Fabrics		
Printcloth, 38½-inch, 64x60	*yd.*	.1425/
Sheeting, 48-inch, 4.17-yd.		.22
52-inch, 3.85-yd.		.23⅞
Chafer Fabrics		
14.30-oz./sq. yd. Pl.	*lb.*	.71
11.65-oz./sq. yd. S.		.63
10.80-oz./sq. yd. S.		.6675
8.9-oz./sq. yd. S.		.68
Other Fabrics		
Headlining, 59-inch, 1.65-yd., 2-ply	*yd.*	.485 / .49
64-inch, 1.25-yd., 2-ply		.6175/ .6225
Sateens, 53-inch, 1.32-yd.		.5675
58-inch, 1.21-yd.		.62

RAYON

TOTAL shipments of all types of rayon by domestic producers during October reached 92,100,000 pounds, 5% above the September figure. October production amounted to 92,700,000 pounds, or 65% of rated capacity, and month-end stocks were 108,500,000 pounds.

October figures for viscose high-tenacity yarn follow: production, 35,700,000 pounds, or 84% of rated capacity and 200,000 pounds below that of the preceding month; total shipments, 34,400,000 pounds, or 400,000 under the September figure; and month-end stocks, 12,300,000 pounds, or 1,300,000 higher than in the previous month.

Production of high-tenacity yarn during the third quarter totaled 117,100,000 pounds, a decrease of 3,500,000 pounds from the preceding quarter. Third-quarter shipments of rayon for use in tires and related products amounted to 111,200,000 pounds, with the average denier of tire yarn shipped being 1.594. Comparable figures for the second quarter were 117,700,000 and 1.581, respectively.

No changes were made in rayon tire yarn and fabric prices during the period from October 16 to November 15, and current prices follow:

Rayon Prices

Tire Yarns

1100/ 480	$0.62	$0.63
1100/ 490		.62
1150/ 490		.62
1165/ 480		.63
1650/ 720		.61
1650/ 980		.61
1820/ 980		.61
2200/ 960		.60
2200/ 980		.60
2200/1466		.67
4400/2934		.63

Tire Fabrics

1100/490/2		$0.72
1650/980/2	$0.659 /	.73
2200/980/2		.685

Latex Film Formation

(*Continued from page 367*)

to flow. Certain monomers also produce a plasticizing effect on other particles, and drying temperature is another important factor, Mr. Lalk stated.

Officers of the Group for the 1953-1954 season are as follows: chairman, John M. Hussey, Goodyear Tire & Rubber Co.; chairman-elect, Frank J. Roderick, Simplex Wire & Cable Co.; secretary-treasurer, Charles S. Frary, Jr., Boston Woven Hose & Rubber Co.; and custodian, Max Taitel, Union Bay State Chemical Co. In addition to the officers the executive committee includes J. H. Faull, consultant; E. R. Kaswell, Fabric Research Laboratories, Inc.; and Fritz Rosenthal, Nashua Corp.

Advisory Committee on Heels and Soles

THE Quartermaster Corps Industry Advisory Committee on Rubber Heels and Soles held its second meeting on November 10 in the Office of the Quartermaster General, Washington, D. C. Stephen J. Kennedy, OQMG research directory for textile, clothing, and footwear, presided.

The first item on the agenda concerned suggested traction designs for heels and soles to provide maximum stability and performance on service and combat footwear. Eleven suggested designs were considered, of which four were selected for further study together with two designs proposed during the discussion. It was felt that all of the selected designs will need at least some minor modifications.

The second subject discussed concerned recommendations of the industry members on the preparation of test samples and plan of tests. Because of the great amount of detail involved in providing working drawings, patterns, and molds to produce the experimental mold designs, it was thought best to contract with various rubber sole manufacturers to produce the required quantities of soles in necessary sizes.

The matter of hardness and abrasion indices of present rubber soles was also considered, and the members recommended that experimental cleated soles be made somewhat softer, with an increase in the abrasion resistance, than current soles. It was also agreed that the ultimate goal is to have cleated heels and soles with maximum durability coupled with non-marking qualities. It was further agreed that personnel in both OQMG and industry should accelerate their work toward the practical realization of this non-marking quality.

Industry members attending the meeting were: Robert Boram, The B. F. Goodrich Co.; Rawson Cowan, New Jersey Rubber Co.; J. D. Gaffen, Holtite Mfg. Co., Inc.; W. P. Harty, Avon Sole Co.; Merrill Hawkins, International Shoe Co.; W. E. Kavenagh, Goodyear Tire & Rubber Co.; Harvey Litterer, Endicott-Johnson Corp.; Arthur Ross, American Biltrite Rubber Co.; and Paul Teretta, O'Sullivan Rubber Corp.

SORG Initiates New Policy on Contributions

THE Southern Ohio Rubber Group has instituted a new policy on contributions to support its annual Christmas party this year. In a letter addressed to the supplier companies by E. N. Cunningham, Precision Rubber Products Corp., chairman of the annual Christmas party committee of the Group, and dated November 18, it is stated that the supplier companies are not being asked for gifts this year to support the party. It is being underwritten by the rubber manufacturers in the Dayton, O., area, and the Group is quite proud of the fact that it has this support of the rubber manufacturers.

The management of the companies who are supporting this plan felt that they have a definite obligation to their technical employes, and this is their way of expressing their appreciation for the work of their technical organizations and at the same time expressing their good will to the suppliers who have supported these parties in the past.

The party is scheduled for the night of December 12 at the Miami Valley Country Club.

Estimated Pneumatic Casings, Tubes, Camelback Shipments, Production, Inventory, September, August, 1953; First Nine Months, 1953, 1952

	Original Equipment	Replacement	Export	Total	Production	Inventory
Passenger Casings						
September, 1953	2,503,074	3,690,756	83,996	6,277,826	6,081,726	10,494,158
Change from previous month				−16.22%	+5.06%	−1.77%
August, 1953	2,757,371	4,648,673	87,181	7,493,225	6,405,649	10,683,635
1st 9 months, 1953	26,135,403	38,061,614	567,686	64,764,703	63,988,231	10,494,158
1952	16,837,826	37,023,540	557,990	54,419,356	54,630,826	7,294,828
Truck and Bus Casings						
September, 1953	334,122	746,894	65,176	1,146,192	1,066,578	2,793,238
Change from previous month				−12.13%	+5.57%	−2.55%
August, 1953	372,361	874,452	57,535	1,304,348	1,010,344	2,866,203
1st 9 months, 1953	3,817,666	7,184,588	524,567	11,526,821	11,450,929	2,793,238
1952	3,865,514	6,514,312	625,386	11,005,212	11,864,563	2,668,633
Total Automotive Casings						
September, 1953	2,837,196	4,437,650	149,172	7,424,018	7,148,304	13,287,396
Change from previous month				−15.61%	−3.61%	−1.94%
August, 1953	3,129,732	5,523,125	144,716	8,797,573	7,415,993	13,549,838
1st 9 months, 1953	29,953,069	45,246,202	1,092,253	76,291,524	75,439,160	13,287,396
1952	20,703,340	43,537,852	1,183,376	65,424,568	66,495,389	9,963,461
Tractor—Implement Casings						
September, 1953	124,793	94,750	8,535	228,078	245,728	775,971
Change from previous month				−8.55%	−6.24%	+2.48%
August, 1953	138,948	105,131	5,314	249,393	262,089	757,181
1st 9 months, 1953	2,057,582	1,140,279	51,019	3,248,880	3,139,425	775,971
1952	2,178,334	1,060,328	82,450	3,321,112	3,401,811	775,100
Passenger, Motorcycle, Truck and Bus Inner Tubes						
September, 1953	2,840,583	2,768,279	110,833	5,719,695	5,655,651	11,287,881
Change from previous month				−12.40%	−0.41%	+10.39%
August, 1953	3,139,369	3,315,332	74,670	6,529,371	5,678,711	10,225,911
1st 9 months, 1953	29,973,508	29,788,751	612,062	60,374,321	59,491,677	11,287,881
1952	20,677,200	26,598,240	844,396	48,119,836	48,099,507	10,303,761
Camelback (Lbs.)						
September, 1953	.....	24,209,173	771,681	24,980,854	23,619,930	29,508,093
Change from previous month	.....	.....		+4.19%	+16.49%	−1.06%
August, 1953	.....	23,390,554	584,836	23,975,390	20,276,813	29,824,673
1st 9 months, 1953	.....	193,758,588	5,794,215	199,552,803	202,360,138	29,508,093
1952	.....	177,934,400	4,027,520	181,961,920	180,694,080	20,388,480

NOTE: Cumulative data on this report include adjustments made in prior months.
SOURCE: The Rubber Manufacturers Association, Inc., New York, N. Y.

CLASSIFIED ADVERTISEMENTS

Continued

MACHINERY AND SUPPLIES FOR SALE (Continued)

FOR SALE

Farrel Ansonia 20 x 48 3-roll calender, motor drive, variable speed controls, all heringbone gears, in A-1 condition.
Farrel Ansonia 15 x 36 2-roll rubber mill, motor drive.

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1—Farrel Birmingham 6" x 13" self-contained 3-roll Calender, m.d.
1—6" x 12" Laboratory Mill, m.d.
2—Ball & Jewell #2 Rotary Cutters; 1—#1; 1, with 3 h.p. motor.
3—#28 Devine Vac. Shelf Dryers, 19-59" x 78" shelves, complete.
1—16" x 40" Rubber Mill, m.d.
3—Royle #4, #3, #1 Extruders.
Also other sizes Hydraulic Presses, Tubers, Banbury Mixers, Mills, Vulcanizers, Calenders, Pellet Presses, Cutters.

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Cable Address: Equipment Hoboken, N.J.

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UNITED RUBBER MACHINERY EXCHANGE
183-189 ORATON ST. CABLE "URME" NEWARK 4, N. J.

(Classified Advertisements Continued on Page 419)

COMPOUNDING INGREDIENTS*

Abrasives

Pumicestone, powdered	lb.	$0.025 /	$0.045
Rottenstone, domestic	lb.	.03 /	.04

Accelerators, Organic

A-10	lb.	.40 /	.47
A-19	lb.	.52 /	.58
A-32	lb.	.66 /	.80
A-77	lb.	.47 /	.60
A-100	lb.	.52 /	.66
Accelerator 49	lb.	.53 /	.54
552	lb.	2.25	
808	lb.	.66 /	.68
833	lb.	.48 /	.505
Altax	lb.	.225	
Arazate	lb.	.66 /	.71
Beutene	lb.	.61 /	.66
Bismate	lb.	3.00	
B-J-F	lb.	.27 /	.32
Butasan	lb.	1.04	
Butazate	lb.	1.04	
Butyl Accelerator 21	lb.	.80	
Eight	lb.	1.10 /	1.35
Zimate	lb.	1.04	
Captax	lb.	.38 /	.40
C-P-B	lb.	1.95	
Cumate	lb.	1.45	
Diesterex N	lb.	.50 /	.57
DOTG (diorthotolylguanidine)	lb.	.57 /	.58
DGP (diphenylguanidine)	lb.	.48 /	.55
El-Sixty	lb.	.50 /	.57
Ethasan	lb.	1.04	
Ethazate	lb.	1.04	
Ethyl Thiurad	lb.	1.04	
Tuads	lb.	1.04	
Tuex	lb.	1.04	
Zimate	lb.	1.04	
Ethylac	lb.	.93 /	.95
Hepteen	lb.	.44 /	.50
Base	lb.	1.85	
Ledate	lb.	1.04	
M-B-T	lb.	.38 /	.43
-XXX	lb.	.49 /	.51
M-B-T-S	lb.	.48 /	.54
-W	lb.	.53 /	.55
Merac	lb.	.75 /	1.05
Mertax	lb.	.49 /	.56
Methasan	lb.	1.04	
Methazate	lb.	1.04	
Methyl Tuads	lb.	1.14	
Zimate	lb.	1.04	
Monex	lb.	1.14	
Mono-Thiurad	lb.	1.14	
Morfex	lb.	.65 /	.70
NOBS No. 1	lb.	.69 /	.71
O-X-A-F	lb.	.49 /	.54
Pentex	lb.	1.04	
Flour	lb.	.21	
Permalux	lb.	2.17	
Phenex	lb.	.52 /	.59
Pip-Pip	lb.	2.07	
R-2 Crystals	lb.	2.45	
Rotax	lb.	.49 /	.51
RZ-50, -50B	lb.	1.00	
S. A. 52	lb.	1.14	
57, 62, 67, 77	lb.	1.04	
66	lb.	2.50	
Santocure	lb.	.69 /	.76
Selenac	lb.	2.50	
Setsit No. 5	lb.	.75 /	1.05
SPDX-GH	lb.	.64 /	.69
GL	lb.	.95	
Tellurac	lb.	1.45	
Tepidone	lb.	.45 /	.48
Tetrone A	lb.	1.91	
Thiocarbanilide (A-1)	lb.	.50 /	.57
Thiofide	lb.	.48 /	.55
S	lb.	.51 /	.58
Thionex	lb.	1.14	
Thiotax	lb.	.38 /	.45
Thiurad	lb.	1.14	
Thiuram E	lb.	1.04	
M	lb.	1.14	
Trimene	lb.	.56 /	.62
Base	lb.	1.03 /	1.10
Tuads	lb.	1.14	
Tuex	lb.	1.14	
Ultex	lb.	1.00 /	1.10
Unads	lb.	1.14	
Ureka Base	lb.	.66 /	.73
Vulcacure NB	lb.	.45	
ZB, ZE, ZM	lb.	.85	
Z-B-X	lb.	2.45	
Zenite	lb.	.48 /	.50
A	lb.	.57 /	.59
Special	lb.	.49 /	.51
Zetax	lb.	.49 /	.51
Zimate	lb.	1.04	

Accelerator-Activators, Inorganic

Lime, hydrated	ton	10.00 /	17.50
Litharge, comml.	lb.	.155 /	.16
Eagle, sublimed	lb.	.155 /	.156
National Lead	lb.	.155 /	.156
Red Lead, comml.	lb.	.16 /	.17
Eagle	lb.	.165	
National Lead	lb.	.165 /	.1675
White lead, basic	lb.	.16 /	.17
Eagle, National Lead	lb.	.16 /	.17
White lead, silicate	lb.	$0.1525 /	$0.1875
Eagle	lb.	.17 /	.1875
National Lead	lb.	.1525 /	.1625
Zinc oxide, comml.†	lb.	.135 /	.1675

Accelerator-Activators, Organic

Aktone	lb.	.22 /	.23
Barak	lb.	.62	
Curade	lb.	.57 /	.59
D-B-A	lb.	1.95	
Delac P	lb.	.45 /	.52
Emersol 110	lb.	.115 /	.14
120	lb.	.12 /	.145
130	lb.	.1425 /	.1675
210 Flaine	lb.	.1225 /	.1525
Emery 600	lb.	.1025 /	.1375
Guantal	lb.	.57 /	.64
Hyfac 400	lb.	.10 /	.125
430	lb.	.14 /	.165
431	lb.	.1625 /	.1875
Laurex	lb.	.30 /	.33
MODX	lb.	.295 /	.345
NA-22	lb.	1.50	
Plastone	lb.	.27 /	.30
Polyac	lb.	1.65	
Seedine	lb.	.1485 /	.1705
Stearex Beads	lb.	.147½ /	.157½
Stearic acid, single pressed	lb.	.1225 /	.14
Double pressed	lb.	.1275 /	.145
Triple pressed	lb.	.15 /	.1675
Tonox	lb.	.515 /	.605
Vulklor	lb.	.75 /	.95
Zinc stearate	lb.	.37 /	.42

Alkalies

Caustic soda, flake	100 lbs.	4.10 /	5.30
Liquid, 50%	100 lbs.	2.55 /	2.75
Solid	100 lbs.	3.70 /	4.90

Antioxidants

AgeRite Alba	lb.	2.35 /	2.45
Gel	lb.	.64 /	.66
H. P.	lb.	.72 /	.74
Hipar	lb.	.98 /	1.00
Powder	lb.	.52 /	.54
Resin	lb.	.75 /	.77
D	lb.	.52 /	.54
Spar	lb.	.52 /	.54
Stalite	lb.	.52 /	.54
White	lb.	1.45 /	1.55
Akroflex C	lb.	.72 /	.79
CD	lb	.72 /	.74
Albasan	lb.	.69 /	.73
Aminox	lb.	.52 /	.57
Antioxidant 2246	lb.	1.65 /	1.68
Antisol	lb.	.23 /	.24
Antox	lb.	.52 /	.54
Aranox	lb.	3.25	
Betanox Special	lb.	.80 /	.85
B-L-E, -25	lb.	.52 /	.57
Burgess Antisun Wax	lb.	.185	
B-X-A	lb.	.52 /	.57
Copper Inhibiter X-872-L	lb.	2.01	
Flectol H	lb.	.52 /	.59
Flexamine	lb.	.72 /	.77
Heliozone	lb.	.26 /	.27
Ionol	lb.	.91 /	1.40
NBC	lb.	1.55	
Neozone A	lb.	.56 /	.58
D	lb.	.52 /	.54
Octamine	lb.	.52 /	.57
Perflectol	lb.	.61 /	.68
Polygard	lb.	.52 /	.57
Rio Resin	lb.	.60 /	.62
Santoflex 35	lb.	.72 /	.79
AW	lb.	.78 /	.85
B	lb.	.52 /	.59
BX	lb.	.63 /	.70
Santovar A	lb.	1.50 /	1.57
O	lb.	1.30 /	1.37
Santowhite Crystals	lb.	1.60 /	1.67
L	lb.	.52 /	.59
MK	lb.	1.29 /	1.36
Sharples Wax	lb.	.23 /	.28
Stabilite	lb.	.55 /	.59
Alba	lb.	.72 /	.79
L	lb.	.60 /	.64
White	lb.	.53 /	.62
Powder	lb.	.41 /	.47
Styphen I	lb.	.51 /	.55
Sunolite	lb.	.21 /	.25
Sunproof -713	lb.	.25 /	.30
Improved	lb.	.25 /	.30
Jr.	lb.	.20 /	.25
Thermoflex A	lb.	.98 /	1.00
Tonox	lb.	.52 /	.57
Tysonite	lb.	.24 /	.2475
V-G-B	lb.	.70 /	.75
Wing-Stay S	lb.	.52 /	.61
Zenite	lb.	.33 /	.35

Antiseptics

Copper naphthenate, 6-8%	lb.	.2275	
Pentachlorophenol	lb.	.21 /	.29
Resorcinol, technical	lb.	.775 /	.785
Zinc naphthenate, 8-10%	lb.	.245 /	.30

Blowing Agents

Ammonium, bicarbonate	lb.	.065 /	.075
Carbonate	lb.	.23 /	.24
Blowing Agent CP- 975	lb.	$0.35	
Celogen	lb.	1.95	
50-C	lb.	1.01 /	$1.07
Sodium bicarbonate	100 lbs.	2.30 /	3.70
Carbonate, tech	100 lbs.	1.35 /	5.02
Sponge Paste	lb.	.20	
Unicel	lb.	.90	
ND	lb.	.79	
S	lb.	.20	

Bonding Agents

G-E Silicone Paste SS-15	lb.	4.52 /	5.10
SS-64	lb.	3.65 /	6.75
-67 Primer	lb.	7.50 /	12.50
Gen-Tac Latex	lb.	.75 /	.855
Kalabond Adhesive	gal.	6.50 /	16.00
Tie Cement	gal.	2.00 /	5.60
MDI	lb.	4.00 /	6.00
-50	lb.	2.00 /	3.06
Thixons	gal.	1.48 /	12.00
Ty Ply BN, Q, S, 3640	gal.	6.75 /	8.00

Brake Lining Saturants

BRT 3	lb.	.018 /	.0265
Resinex L-S	lb.	.0225 /	.03

Carbon Blacks‡

Conductive Channel—CC

Continental R-40	lb.	.23 /	.30
Kosmos/Dixie BB	lb.	.23 /	.30
Spheron C	lb.	.14 /	.185
I	lb.	.12 /	.165
N	lb.	.25 /	.29
Voltex	lb.	.18 /	.315

Easy Processing Channel—EPC

Continental AA	lb.	.074 /	.1225
Kosmobile 77 /Dixiedensed 77	lb.	.074 /	.1225
Micronex W-6	lb.	.074 /	.1225
Spheron #9	lb.	.074 /	.1225
Texas E	lb.	.074 /	.1175
Witco #12	lb.	.074 /	.1225
Wyex	lb.	.074 /	.12

Hard Processing Channel—HPC

Continental F	lb.	.074 /	.1225
HX	lb.	.074 /	.12
Kosmobile S/Dixiedensed S	lb.	.074 /	.1225
Micronex Mk. II	lb.	.074 /	.1225
Spheron #4	lb.	.074 /	.1225
Witco #6	lb.	.074 /	.1225

Medium Processing Channel—MPC

Arrow TX	lb.	.074 /	.12
Continental A	lb.	.074 /	.1225
Kosmobile S-66 /Dixiedensed S-66	lb.	.074 /	.1225
Micronex Standard	lb.	.074 /	.1225
Spheron #6	lb.	.074 /	.1225
Texas M	lb.	.074 /	.1175
Witco #1	lb.	.074 /	.1225

Conductive Furnace—CF

Aromex 115	lb.	.089 /	.129
Vulcan C	lb.	.11 /	.153
SC	lb.	.18 /	.223

Fast Extruding Furnace—FEF

Arovel	lb.	.06 /	.10
Continental FEF	lb.	.06 /	.10
Kosmos 50/Dixie 50	lb.	.06 /	.10
Statex M	lb.	.06 /	.10
Sterling SO	lb.	.06 /	.10

Fine Furnace—FF

Statex B	lb.	.065 /	.105
Sterling 99	lb.	.065 /	.105

High Abrasion Furnace—HAF

Aromex	lb.	.079 /	.125
Continex HAF	lb.	.079 /	.125
Kosmos 60/Dixie 60	lb.	.079 /	.1175
Philblack O	lb.	.079 /	.119
Statex R	lb.	.079 /	.125
Vulcan #3	lb.	.079 /	.122
6	lb.	.11 /	.153

Medium Abrasion Furnace—MAF

Philblack A	lb.	.06 /	.10

Super Abrasion Furnace—SAF

Kosmos 70/Dixie	lb.	.11 /	.155
Philblack E	lb.	.145 /	.175
I	lb.	.11 /	.15
Statex 125	lb.	.11 /	.155
Vulcan 9	lb.	.135 /	.178

General-Purpose Furnace—GPF

Sterling V	lb.	.05 /	.09

*Prices in general are f.o.b. works. Range indicates grade or quantity variations. Space limitation prevents listing of all known ingredients. Prices are not guaranteed; contact suppliers for spot prices.

†For trade names, see Color—White, Zinc Oxides.

‡At the request of the suppliers, the lowest prices shown for carbon blacks are for carloads in bags. Prices for hopper carloads are lower.

High Modulus Furnace—HMF

Continex HMF	lb.	$0.055 /	$0.095
Kosmos 40/Dixie 40	lb.	.055 /	.095
Modulex	lb.	.055 /	.095
Statex 93	lb.	.055 /	.095
930	lb.	.047 /	.087
Sterling L, LL	lb.	.055 /	.095

Semi-Reinforcing Furnace—SRF

Continex SRF	lb.	.045 /	.085
Essex	lb.	.045 /	.085
Furnex	lb.	.045 /	.085
Gastex	lb.	.05 /	.09
Kosmos 20/Dixie 20	lb.	.045 /	.085
Pelletex, NS	lb.	.045 /	.085
Sterling NS, S	lb.	.045 /	.085
R	lb.	.05 /	.09

Fine Thermal—FT

P-33	lb.	.055	
Sterling FT	lb.	.055	

Medium Thermal—MT

Sterling MT	lb.	.035	
Non-staining	lb.	.045	
Thermax	lb.	.035	
Stainless	lb.	.045	

Chemical Stabilizers

Argus stabilizers	lb.	.60 /	1.38
Dutch Boy DS-207	lb.	.53 /	.55
Dyphos	lb.	.56 /	.58
Dythal	lb.	.40 /	.42
Normasal	lb.	.45 /	.47
Plumb-O-Sil A	lb.	.2875/	.3075
B	lb.	.3025/	.3225
C	lb.	.3325/	.3525
Tribase	lb.	.265 /	.285
E	lb.	.235 /	.255
Eagle Basic Silicate White			
Lead 201	lb.	.1775/	.1875
202	lb.	.17 /	.18
Stabelans	lb.	.60 /	1.70
Staycin 1	lb.	.65	
Vanstay HT	lb.	.90 /	.92
HTR	lb.	1.20 /	1.22
L	lb.	.33 /	.35
S	lb.	.65 /	.70
Witco Lead Stearate #30	lb.	.32 /	.37
P-30	lb.	.39 /	.44
Stayrite #10	lb.	.32 /	.37
P-10	lb.	.39 /	.44
#15	lb.	.53 /	.57
#20	lb.	.37 /	.42
#22	lb.	1.40 /	1.44
#25	lb.	.35 /	.40
#70, 80, 90	lb.	.70	

Colors

Black

Black Paste #25	lb.	.22 /	.40
BK Iron Oxides	lb.	.1275/	.13
Covinylblaks	lb.	.68 /	.145
Ivo Bone Blacks	lb.	.15 /	.2025
Lampblack, comml	lb.	.16 /	.45
Superjet	lb.	.0825/	.1175
Mapico	lb.	.1275/	.13
MB Mineral Blacks	lb.	.0315/	.0675
Stan-Tone	lb.	.45 /	1.20

Blue

Du Pont	lb.	1.77 /	4.55
Heveatex pastes	lb.	.80 /	1.45
Stan-Tone	lb.	1.55 /	1.60
Toners	lb.	.30 /	3.50

Brown

Brown Paste #5, #10	lb.	.35 /	.45
Mapico	lb.	.1375/	.205
Tan	lb.	.1975/	.20
Metallic brown	lb.	.04 /	.05
Plastics brown	lb.	.0625/	.07
Sienna, burnt	lb.	.0425/	.155
Raw	lb.	.045 /	.1325
Umber, burnt	lb.	.06 /	.07
Raw	lb.	.0625/	.07

Green

Chrome	lb.	.19 /	.49
Oxide	lb.	.3925/	1.10
Du Pont	lb.	1.97 /	3.20
G-4099, -6099	lb.	.3925/	.3975
GH-9869	lb.	1.00 /	1.15
9976	lb.	1.10 /	1.25
Heveatex pastes	lb.	.95 /	1.85
Stan-Tone	lb.	1.75 /	4.60
Toners	lb.	.35 /	4.00

Orange

Du Pont	lb.	2.75	
Orange Paste #13	lb.	1.35 /	1.50
Stan-Tone	lb.	.70 /	3.35
Toners	lb.	.30 /	1.50

Red

Antimony trisulfide	lb.	.38 /	.385
R. M. P. No. 3	lb.	.72 /	
Sulfur Free	lb.	.78 /	
Cadmium red lithopone	lb.	1.64 /	2.05
Cadmolith	lb.	1.72 /	2.05
Du Pont	lb.	1.47 /	1.80
Indian Red	lb.	.1275	
Iron oxide, red	lb.	.06 /	.13
Mapico	lb.	.1275/	.13
Red Paste #17, I-2	lb.	.95 /	1.10
Rub-Er-Red	lb.	.0975	
Stan-Tone	lb.	1.05 /	4.05
Toners	lb.	.25 /	4.15

White

Antimony oxide	lb.	$0.275 /	$0.395
Burgess Iceberg	ton	50.00	
Lithopone, titanated	lb.	.10 /	.11
Cryptone BT	lb.	.10 /	.11
Titanium pigments			
Rayox LW	lb.	.195 /	.205
R-110	lb.	.215 /	.225
Ti-Cal	lb.	.075 /	.0825
Ti-Pure	lb.	.195 /	.225
Titanox A, AA, A-168	lb.	.21 /	.22
C-50	lb.	.1225/	.1275
RA, -10, -50	lb.	.23 /	.24
RC	lb.	.0825/	.0875
-HT, -HTX	lb.	.08 /	.085
Zopaque	lb.	.21 /	.22
Zinc oxide, comml	lb.	.135 /	.1675
Azo ZZZ-11, -44, -55	lb.	.135 /	.145
20% leaded	lb.	.1375/	.1475
35% leaded	lb.	.14 /	.15
50% leaded	lb.	.14⅛/	.15⅛
Eagle AAA, lead free	lb.	.135 /	.145
5% leaded	lb.	.135 /	.145
35% leaded	lb.	.14 /	.15
50% leaded	lb.	.14⅛/	.15⅛
Florence Green Seal	lb.	.1525/	.1625
Red Seal	lb.	.1475/	.1575
White Seal	lb.	.1575/	.1675
Horsehead XX-4, -78	lb.	.135 /	.145
Kadox -15, -17, -22	lb.	.135 /	.145
-25	lb.	.1575/	.1675
Lehigh, 35% leaded	lb.	.14 /	.15
50% leaded	lb.	.14⅛/	.15⅛
Protox-166, -167	lb.	.135 /	.145
St. Joe, lead free	lb.	.135 /	.145
Zinc sulfide, comml	lb.	.253 /	.263
Cryptone ZS	lb.	.253 /	.263

Yellow

Cadmium yellow lithopone	lb.	1.20 /	1.21
Cadmolith	lb.	1.29 /	1.37
Chrome	lb.	.31 /	.33
Du Pont	lb.	1.80 /	2.15
Iron oxide, yellow	lb.	.038 /	.1075
Mapico	lb.	.105 /	.1075
Stan-Tone	lb.	1.00 /	1.55
Toners	lb.	.50 /	1.37
Yellow D	lb.	1.25 /	1.35

Dispersing Agents

Darvan Nos. 1, 2, 3	lb.	.22 /	.30
Kreelons	lb.	.15 /	.16
Modicols	lb.	.17 /	.58
Triton R-100	lb.	.12 /	.25

Dusting Agents

Extrud-o-Lube, conc	gal.	1.54 /	1.69
Glycerized Liquid Lubricant, concentrated	gal.	1.48 /	1.63
Lubrex	lb.	.25 /	.30
Mica	lb.	.075 /	.085
Pyrax A	ton	13.50	
W. A.	ton	16.00	
Snow Crest Talc	ton	33.00 /	35.00
Vanfre	gal.	2.00 /	2.50

Extenders

BRS 700	lb.	.02 /	.0285
BRT 7	lb.	.03 /	.031
Burgess MX-50	ton	150.00	
Car-Bel-Ex A	lb.	.14	
Dielex B	lb.	.06	
Factice, Amberex	lb.	.29 /	.36
Brown	lb.	.1425/	.268
Neophax	lb.	.157 /	.268
White	lb.	.144 /	.285
Mineral Rubbers			
Black Diamond	ton	38.00 /	40.00
Extender 600	lb.	.185	
Hard Hydrocarbon	ton	46.50 /	48.50
Hydrocarbon MR	ton	45.00 /	55.00
Parmr	ton	21.00 /	29.00
T-MR Granulated	ton	47.50 /	50.00
Nuba No. 1, 2	lb.	.0575/	.0625
3X	lb.	.0775/	.0825
Rubber substitute, brown	lb.	.137 /	.2625
White	lb.	.156 /	.292
Stan-Shells	ton	35.00 /	73.00
Synthetic 100	lb.	.41	

Fillers, Inert

Barytes, floated, white	ton	41.60 /	60.10
Off-color, domestic	ton	25.00	
No. 1	ton	41.35 /	60.10
2	ton	39.35 /	58.00
Sparmite	ton	75.00 /	80.00
Blanc fixe	ton	100.00 /	155.00
Clays			
Aiken	ton	14.00	
Albacar	ton	50.00 /	55.00
Aluminum Flake	ton	20.00 /	60.00
#5	ton	23.50 /	26.50
Champion	ton	14.00	
Crown	ton	14.00 /	33.00
GK Soft Clay	ton	11.00	
Hi-White R	ton	13.50	
Hydratex R	ton	28.00	
Paragon	ton	13.50 /	31.50
McNamee	ton	13.50	
RX-43	ton	33.00	
Stan-Clay	ton	28.00	
Stellar-R	ton	50.00	
Suprex	ton	14.00 /	32.00
W-1291 English	ton	53.00 /	55.00
Witco #1	ton	14.00 /	30.00
#2	ton	13.50 /	30.00
Cryptone BA, CB, MS	lb.	$0.08 /	$0.0825
Flocks			
Cotton, dark	lb.	.095 /	.112
Dyed	lb.	.55 /	.60
White	lb.	.13 /	.33
Fabrifil X-24-G	lb.	0.095	
X-24-W	lb.	.135	
Filfloc 6000	lb.	.16	
F-40-900	lb.	.105	
Kalite	ton	50.00 /	65.00
Lithopone, comml	lb.	.075 /	.085
Albalith	lb.	.075 /	.085
Astrolith	lb.	.06¾/	.0675
Eagle	lb.	.0725/	.075
Sunolith	lb.	.079 /	.089
Mica	lb.	.075 /	.085
Millical	ton	35.00 /	50.00
No. 1 Silica	ton	22.00 /	40.00
Non-Fer-Al	ton	30.00 /	45.00
Pyrax A	ton	12.50	
W. A.	ton	15.00	
SL Slate Flour	ton	17.00 /	25.00
Stan-White	ton	8.50 /	9.45
Super-White Silica	ton	23.00 /	43.00
Suspenso	ton	33.00 /	48.00
Terra Alba 1319	ton	27.00	
Ti-Cal	lb.	.0675	
Whiting, limestone	ton	32.00 /	34.00
Calcite	ton	21.50	
Paxinosa	ton	10.00 /	18.00
Witco	ton	8.50	

Finishes

Black-out	gal.	4.50 /	8.00
Flocks			
Cotton, dark	lb.	.095 /	.112
Dyed	lb.	.55 /	.60
White	lb.	.13 /	.33
Rayon, colored	lb.	.90 /	1.50
White	lb.	.75 /	1.25
Rubber lacquer, clear	gal.	1.00 /	2.00
Colored	gal.	2.00 /	3.50
Shoe varnish	gal.	1.45	
Talc	ton	14.00 /	38.50
Nytals	ton	25.00 /	36.00
Wax, Bees	lb.	.47 /	.58
Carnauba	lb.	.85 /	1.20
Montan	lb.	.12 /	.32
No. 118, colors	gal.	.86 /	1.41
Neutral	gal.	.76 /	1.31
Van Wax	gal.	1.45 /	1.50

Latex Compounding Ingredients

Accelerator 552	lb.	2.25	
J-117, -302	lb.	1.00 /	1.15
-144	lb.	.15 /	.30
-307	lb.	1.10 /	1.25
-311	lb.	.60 /	.75
Aerosol	lb.	.35	
AgeRite Dispersions	lb.	.60 /	2.25
Alcogum AX-6	lb.	.05	
AX-10	lb.	.085	
Amberex Solutions	lb.	.1675/	.18
Antifoam J-114	lb.	3.25 /	3.45
P-242	lb.	.24 /	.35
Antioxidant J-137, -140	lb.	.55 /	.70
-139, -293	lb.	1.45 /	1.60
-182	lb.	2.00 /	2.15
-186	lb.	1.40 /	1.55
Anti-Webbing Agent J-183	lb.	.75 /	.90
-297	lb.	.27 /	.40
Aquablaks	lb.	.085 /	.1775
Aquarex D	lb.	.78	
G	lb.	.21	
L	lb.	.94	
MDL	lb.	.33	
ME	lb.	.94	
NS	lb.	.60	
SMO	lb.	.50	
WAQ	lb.	.25	
Areskap 50	lb.	.30 /	.38
100, dry	lb.	.60 /	.72
Aresket 240	lb.	.30 /	.38
300, dry	lb.	.60 /	.72
Aresklene 375	lb.	.42 /	.57
Black No. 25, dispersed	lb.	.22	
Casein	lb.	.22 /	.40
Coagulant P-379	gal.	1.30 /	1.90
-392	gal.	1.55 /	2.15
CW-12	lb.	.85	
37	lb.	.70	
Dispersed Sulfur No. 2	lb.	.10 /	.12
Factice dispersions	lb.	.26 /	.42
Gelling Agent P-397	lb.	.34 /	.37
Habuco Resin Emulsion			
#226	lb.	.227 /	.232
2246-A	lb.	.275 /	.28
3408-B	lb.	.18 /	.19
Laton L	lb.	.075 /	.0775
Ludox	lb.	.1675/	.1925
Marmix	lb.	.41 /	.48
Micronex, colloidal	lb.	.06 /	.07
Pliolite Latex 150, 190	lb.	.32 /	.41
170	lb.	.37 /	.46
Resin Emulsion A-2	lb.	.16 /	.25
P-370	lb.	.175 /	.25
X-210	lb.	.12 /	.22
Resin V	lb.	.13 /	
Santomerse D	lb.	.44 /	.65
S	lb.	.13 /	.25
Stablex A	lb.	.80 /	1.10
B, G	lb.	.50 /	.95
K	lb.	.27 /	.35
P	lb.	.35 /	.50
T	lb.	.14 /	.22
Sulfur dispersions	lb.	.12 /	.30
Webnix #34	lb.	1.50 /	2.25
Zinc oxide dispersions	lb.	.21 /	.34

Mold Lubricants

Aquarex Compounds	lb.	$0.28 /	$0.97
Colite Concentrate	gal.	.90 /	1.15
ELA	lb.	.82	
DC Mold Release Fluid	lb.	4.14 /	6.00
Emulsion Nos. 35, 35A, 35B	lb.	1.46 /	3.50
DC 7	lb.	6.20 /	6.80
Glycerized Liquid Lubricant, concentrated	gal.	1.48 /	1.63
Lubrex	lb.	.25 /	.30
Lubri-Flo	gal.	10.00 /	12.05
Mold Paste	lb.	.25	
Monten Wax	lb.	.57	
Para Lube	lb.	.046 /	.048
Polyglycol E series	lb.	.29 /	.42
Rubber-Glo	gal.	.94 /	.97
Soap, Hawkeye	lb.	1.35 /	1.45
Purity	lb.	.155 /	.165
Sodium stearate	lb.	.40	
Vanfre	gal.	2.50 /	3.00

Odorants

Alamasks	lb.	.75 /	6.50
Curodex 19	lb.	4.75	
188	lb.	5.75	
198	lb.	6.75	
Rodo No. 0	lb.	4.00 /	4.50
No. 10	lb.	5.00 /	5.50

Plasticizers and Softeners

Akroflex C	lb.	.695 /	.715
Aro Lene #1980	lb.	.10 /	.12
Baker AA Oil	lb.	.205 /	.25
Crystal O Oil	lb.	.22 /	.265
Processed oils	lb.	.225 /	.245
Bardol	lb.	.0275/	.0375
639	lb.	.0275/	.045
B	lb.	.0625/	.065
Bondogen	lb.	.55 /	.60
BRC 20	lb.	.15 /	.175
30	lb.	.0125/	.021
521	lb.	.019 /	.02
BRH 2	lb.	.0213/	.0351
BRS 700	lb.	.02 /	.0285
BRT 7	lb.	.03 /	.031
BRV	lb.	.0475/	.0565
Bunarex Liquid	lb.	.0425/	.0555
Resins	lb.	.065 /	.1225
Bunnatol G. S.	lb.	.40 /	.505
Butac	lb.	.125 /	.135
BxDC	lb.	.40 /	.41
Cabflex DDA	lb.	.49	.5175
DDP	lb.	.38 /	.4075
Di-BA	lb.	.435 /	.4625
OA	lb.	.45	.4775
OP	lb.	.35	.3775
OZ	lb.	.52	.5475
Cabol 100	lb.	.02	.07
Carbonex S	lb.	.0475	.05
Chlorowax 40	lb.	.145	.225
70	lb.	.18 /	.24
-S	lb.	.21 /	.27
Contogums	lb.	.0875/	.111
Cumar EX	lb.	.0525	
MH	lb.	.065 /	.11
V	lb.	.0975/	.1275
Darex Plasticizer DBM	lb.	.30 /	.3275
Dielex B	lb.	.06	
Dipolymer Oil	gal.	.33 /	.38
Dispersing Oil No. 10	lb.	.06 /	.0625
Duraplex C-50 LV, 100°C	lb.	.25 /	.295
Dutrex 6	lb.	.025 /	.035
Fortex	lb.	.125 /	.145
Galex W-100	lb.	.135 /	.1725
W-100D	lb.	.1325/	.17
Gilsowax B	lb.	.09 /	.11
Good-rite GP-233	lb.	.45 /	.59
GP-261	lb.	.37 /	.49
Harchemex	lb.	.3025 /	.3925
Hartflex 500	lb.	.32 /	.35
Heavy Resin Oil	lb.	.0225/	.0375
HSC-13	lb.	.27 /	.30
Indoil Compound 51-S	lb.	1.00 /	1.10
Indonex	gal.	.11 /	.19
Marvinol plasticizers	lb.	.28 /	.8825
Nevillac	lb.	.31 /	.85
Neville R. Resins	lb.	.13 /	.35
Nevinol	lb.	.20	
No. 1-D heavy oil	lb.	.055 /	.065
Palmalene	lb.	.15	
Paraflex BN-1	lb.	.185 /	.225
Para Flux, regular	gal.	.10 /	.2125
No. 2016	gal.	.165 /	.24
2332	gal.	.11	
4205	lb.	.1075/	.2125
Para Lube	lb.	.046 /	.048
Resins	lb.	.04 /	.045
Paradene Resins	lb.	.065 /	.075
Peptizene #2	lb.	.90	
Pepton 22	lb.	.79 /	.82
Picco Resins	lb.	.13 /	.185
480 Oilproof Series	lb.	.18 /	.23
S. O. S.	gal.	.29 /	.34
Piccocizers	lb.	.04 /	.068
Piccolastic Resins	lb.	.1855/	.34
Piccolyte Resins	lb.	.185 /	.25
Piccopale Resins	lb.	.12 /	.135
Piccoumaron Resins	lb.	.07 /	.185
Piccovars	lb.	.145 /	.20
Piccovol	lb.	.025 /	.038
Pictar	gal.	.25 /	.30
Pigmentar, American	lb.	.041 /	.0678
Sunny South	lb.	.0389/	.0678
Pigmentaroil, American	lb.	.041 /	.0678
Sunny South	lb.	.0389/	.0678
Pitch, Burgundy, Sunny South	lb.	.098 /	.1025
Plasticizer 35	lb.	$0.205 /	$0.24
36	lb.	.305 /	.34
42	lb.	.34 /	.40
B	lb.	.35 /	.45
DP-520	lb.	.435 /	.455
MT-511	lb.	.535 /	.565
ODN	lb.	.32 /	.37
PX series	lb.	.385 /	.75
SC	lb.	.61 /	.69
Plastogen	lb.	.0775/	.08
Plastone	lb.	.22 /	.30
Polycizers	lb.	.40 /	.4775
PT67 Light Pine Oil	gal.	.60	
101 Pine Tar Oil	gal.	.335 /	.445
Pine Tars	gal.	.35 /	.46
R-19, R-21 Resins	lb.	.1075/	
Reogen	lb.	.1325/	.135
Resin C pitch	lb.	.0225/	.031
R6-3	lb.	.38 /	.40
Resinex	lb.	.0325/	.0375
L-4	lb.	.0225/	.03
Rosin Oil, Sunny South	gal.	.58 /	.875
RPA No. 2	lb.	.78	
3	lb.	.47	
Conc.	lb.	.97	
5	lb.	.59	
RSN Flux	gal.	.10 /	.19
Rubber Oil B-5	lb.	.0225/	.0355
Rubberol	lb.	.2575/	.2725
Seedine	lb.	.1485/	.1705
Softener #20	gal.	.10 /	.20
Special Rubber Resin	100 lb.	.1675/	.2175
Starex Beads	lb.	.1475/	.1575
Starite	lb.	.095 /	.10
Syn-Tac	gal.	.33 /	.35
Synthol	lb.	.2475	
Thiokol TP-90B	lb.	.59 /	.69
-95, -98	lb.	.65	
TR-11	lb.	.035	
Turgum S	lb.	.1075/	.1175
Tysonite	lb.	.24 /	.2475
X-1 Resinous Oil	lb.	.021 /	.0275
XX-100 Resin	lb.	.0525	

Reclaiming Oils

Bardol	lb.	.0275/	.0375
639	lb.	.0275/	.045
B	lb.	.0625/	.065
BRH 2	lb.	.0213/	.0351
BRT 4	lb.	.025 /	.026
BRV	lb.	.0475/	.0565
Bureo-RA	lb.	.055 /	.0825
BWH-1	lb.	.16 /	.18
Dipolymer Oil	gal.	.33 /	.43
Dispersing Oil No. 10	lb.	.06 /	.0625
Heavy Resin Oil	lb.	.0225/	.0375
LX-759	gal.	.16 /	.165
-774, -777	gal.	.23 /	.33
No. 1621	lb.	.025 /	.035
3186	gal.	.28 /	.295
Picco 6535	gal.	.25 /	.30
C-33	gal.	.215 /	.315
-42	gal.	.23 /	.33
D-4	gal.	.27 /	.37
E-5	gal.	.25 /	.35
O-Oil	gal.	.286 /	.36
PT 101 Pine Tar Oil	gal.	.335 /	.445
150 Pine Solvent	gal.	.44	
Reclaiming Oil #3186	gal.	.28 /	.385
G	gal.	.25 /	.365
4039-M	gal.	.3275/	.3975
V	gal.	.30 /	.37
RR-10	lb.	.36	
S. R. O.	lb.	.015 /	.0225
X-1 Resinous Oil	lb.	.021 /	.03

Reinforcers, Other Than Carbon Black

BRC 20	lb.	.15 /	.175
30	lb.	.0125/	.021
521	lb.	.019 /	.02
Bunarex resins	lb.	.065 /	.1225
Calcene NC	ton	72.50 /	92.50
TM	ton	75.00 /	95.00
Calco S. A.	lb.	.85 /	.88
Carbonex S	lb.	.0475/	.05
Clays			
Aiken	ton	14.00	
Aluminum Flake	ton	20.00 /	60.00
#5	ton	23.50 /	26.50
Buca	ton	40.00	
Burgess Iceberg	ton	50.00	
Pigment No. 20	ton	35.00	
30	ton	37.00	
Catalpo	ton	30.00	
Crown	ton	14.00 /	33.00
Dixie	ton	14.00	
L. G. B.	ton	17.00	
Paragon (R)	ton	13.50 /	33.00
Pigment No. 33	ton	30.00	
Suprex	ton	14.00 /	33.50
Witco No. 1	ton	14.00 /	30.00
No. 2	ton	13.50 /	30.00
Clearcarb	lb.	.1175/	.1225
Cumar EX	lb.	.0525	
MH	lb.	.065 /	.1175
V	lb.	.0975/	.1275
Good-rite Resin 50	lb.	.42 /	.45
K Series Polymers	lb.	.15 /	.37
Hi-Sil	lb.	.10 /	.115
C	lb.	.11 /	.125
Kralac A-FP	lb.	.43 /	.54
Marbon resins	lb.	.42 /	.49
Multifex	ton	140.00 /	155.00
MM	ton	110.00 /	125.00
Neville R. Resins	lb.	.10 /	.155
Para Resins 2457, 2718	lb.	.04 /	.45
Pico Resins	lb.	.13 /	.185
Piccolyte Resins	lb.	$0.185 /	$0.25
Piccoumaron Resins	lb.	.07 /	.185
Piccovars	lb.	.145 /	.20
Pliolite NR types	lb.	.98 /	1.33
S-3, -6, -6B	lb.	.42 /	.49
Resin C Pitch	lb.	.0225/	.031
Resinex	lb.	.0325/	.0375
Rubber Resin LM-4	lb.	.28 /	.35
S-Polymers	lb.	.44	
Silene EF	ton	120.00 /	140.00
Silvacons	ton	55.00 /	85.00
Super Multifex	ton	160.00 /	175.00
Witcarb R	ton	105.00 /	120.00
-12	ton	45.00 /	66.00
Zeolex 20	ton	120.00 /	140.00
Zinc oxide, commercial†	lb.	.135 /	.1675

Retarders

Cumar RH	lb.	.105	
Delac J	lb.	.55 /	.60
E-S-E-N	lb.	.35 /	.37
Good-rite Vultrol	lb.	.62 /	.66
R-17 Resin	lb.	.1075/	.36
Retarder ASA	lb.	.57	
PD	lb.	.35 /	.37
TCM	lb.	.65	
W	lb.	.45	
Retardex	lb.	.47 /	.50
RM	lb.	1.25	
Thionex	lb.	1.25	

Solvents

2-50-W Hi-Flash Solvent	gal.	.41	
3-BX Naphtha	gal.	.37	
Bondogen	lb.	.55 /	.60
Cosols	gal.	.37 /	.48
Dichloro Pentanes	lb.	.04 /	.07
Dinentene DD	gal.	.445 /	.68
GVL	lb.	1.00	
LX-572 Oil	gal.	.27 /	.32
-748 Solvent	gal.	.16 /	.23
Nevsol H	gal.	.19 /	.29
HF, T	gal.	.24 /	.34
Penetrell	gal.	.445 /	.68
Picco Hi-Solv Solvents	gal.	.19 /	.45
Pine Oil DD	gal.	.755 /	.955
PT 150 Pine Solvent	gal.	.44	
Skellysolve-E	gal.	.153	
-H	gal.	.133	
-R, -V	gal.	.109	
-S	gal.	.099	

Synthetic Resins

Geon Latices (dry wt.)	lb.	.38 /	.52
Paste Resins	lb.	.38 /	.59
Plastics	lb.	.35 /	.80
Polyblend	lb.	.475 /	.575
Polyvinyl resins	lb.	.38 /	.70
Kenflex A, L	lb.	.26 /	.27
B	lb.	.23 /	.24
N	lb.	.18 /	.19
Kralastic	lb.	.65 /	1.30
Marvinol VR-10, -20	lb.	.36 /	.52
Plio-Tuf G75C, G85C	lb.	.52 /	.58

Synthetic Rubber and Latices

Butaprene Latex (dry wt.)			
NL types	lb.	.47 /	.52
NXM types	lb.	.55 /	.60
Butanrene NAA	lb.	.54 /	.55
NF	lb.	.49 /	.50
NL	lb.	.50 /	.51
NXM	lb.	.58 /	.59
Chemigum 30N4NS, 50N4NS	lb.	.50 /	.57
N1NS	lb.	.64 /	.71
N3NS	lb.	.58 /	.65
Latex (dry wt.)			
101 types	lb.	.35 /	.42
200, 245 types	lb.	.47 /	.55
235 types	lb.	.55 /	.63
Hycar 1001, 1011	lb.	.58 /	.59
1002, 1012	lb.	.50 /	.51
1022	lb.	.51 /	.52
1411	lb.	.62 /	.63
2001	lb.	.55 /	.56
4021	lb.	1.34 /	1.35
Hycar Latex (dry wt.)			
1551, 1561	lb.	.55 /	.60
1552, 1562	lb.	.47 /	.52
Neoprene Latex (dry wt.)			
Type 571, 842-A	lb.	.37 /	.48
572	lb.	.39 /	.50
601-A, 735	lb.	.40 /	.51
735	lb.	.38 /	.49
Neoprene Type AC, CG	lb.	.55 /	.80
GN, GN-A, W, WHV	lb.	.41 /	.44
GRT, S	lb.	.42 /	.45
KNR	lb.	.75 /	.78
O	lb.	1.00 /	1.03
WRT	lb.	.45 /	.48
Paracril 18-80	lb.	.60 /	.61
AJ	lb.	.485 /	.495
Paracril			
B, BJ	lb.	.50 /	.51
BV	lb.	.51 /	.52
C	lb.	.58 /	.59
CS, CV	lb.	.59 /	.60
Paraplex X-100	lb.	1.00	
Silastic	lb.	2.30 /	4.05
Thiokol LP-2, -3	lb.	.96	
-8	lb.	1.25	
PR-1	lb.	1.95	
Type A	lb.	.47	
FA	lb.	.64	
ST	lb.	1.00	

CLASSIFIED ADVERTISEMENTS
Continued

MACHINERY AND SUPPLIES FOR SALE (Continued)

FOR SALE—IMMEDIATE DELIVERY: ELEVEN (11) 40" McNEIL Dual Tire Curing Presses. Five (5) Model 230-40-16. Six (6) Model 230-40-16-12. Also six (6) additional Model 230-40-16 available approximately January, 1954. All above compete with timer, operating valves and are in good operating condition. Can be inspected at site, if desired. Subject to prior sale. Seller reserves right to reject any or all bids. Address Box No. 1411, care of INDIA RUBBER WORLD.

MACHINERY & SUPPLIES WANTED

WANTED: RUBBER MACHINERY INCLUDING BANBURY Mixers, Heavy-Duty Mixers, Calenders, Rubber Rolls & Mixers, Extruders, Grinders & Cutters, Hydraulic Equipment, Rotary and Vacuum Shelf Dryers, Injection Molding Machines. Will consider a now-operating or shut-down plant. P. O. Box 1351, Church Street Sta., New York 8, N. Y.

WANTED: 500-G.P.M. PUMP, ELECTRIC DRIVEN HORIZONTAL shaft for cold water at 75 P.S.I. Also 9,000- or 10,000-gal. pressure tank, 100 P.S.I. test. Must be in good condition and within 500 miles. Address Box No. 1407, care of INDIA RUBBER WORLD.

BUSINESS OPPORTUNITIES

MANUFACTURING BUSINESS WANTED
We are now manufacturing over $20,000,000 in various lines and wish to expand by acquisition of assets or stock of one or more industrial companies. In our negotiations the sellers' problems and wishes will receive full consideration. Present personnel will normally be retained.
Address all replies "confidentially" C. J. GALE, Sec., 233 Broadway, New York 7, N. Y. RE 2-9360

Thiokol Latex (dry wt.)		
Type MF	lb.	$0.85
MX	lb.	.70
WD-2	lb.	.92
-6	lb.	.70

Tackifiers

Bunarex resins	lb.	.065 / $0.1225
Chlorowax 70	lb.	.18 / .24
Contogums	lb.	.0875 / .11
Galex W-100	lb.	.155 / .1925
W-100D	lb.	.1525 / .19
Indopol H-100	gal.	.85 / 1.00
H-300	gal.	1.00 / 1.16
Natac	lb.	.12 / .13
Nevindene	lb.	.15 / .18
Picco Resins	lb.	.13 / .185
Piccolastic Resins	lb.	.1855 / .34
Piccolyte Resins	lb.	.185 / .25
Piccopale Resins	lb.	.12 / .135
Piccoumaron Resins	lb.	.07 / .185
Synthetic 100	lb.	.41
Synthol	lb.	.2475 / .2625

Vulcanizing Agents

Dibenzo G-M-F	lb.	2.60	
G-M-F #113	lb.	.90	
G-M-F #117	lb.	2.60 / .90	
Ko-Blend I. S.	lb.	.385	
Litharge, commercial	lb.	.155 /	.16
Eagle, sublimed	lb.	.155 /	.156
National Lead	lb.	.155 /	.156
Magnesium oxide	lb.	.31	
Red lead, commercial	lb.	.16 /	.17
Eagle	lb.	.165	
National Lead	lb.	.165 /	.1675
Sulfasan R	lb.	1.50	
Sulfur flour, comml.	100 lbs.	3.60 /	5.25
Calco	100 lbs.	2.15 /	7.50
Crystex	lb.	.195	
Insoluble 60	lb.	.125 /	.13
Rubbermakers	100 lbs.	2.40 /	4.30
Stauffer	lb.	.0215 /	.0335
Telloy	lb.	2.50	
Vandex	lb.	4.75	
Vultac No. 2	lb.	.47 /	.755
3	lb.	.51 /	.795
White lead silicate	lb.	.1525 /	.1875
Eagle	lb.	.17 /	.1875
National Lead	lb.	.1525 /	.1625

Financial

American Zinc, Lead & Smelting Co., Columbus, O., and wholly owned subsidiaries. Year ended September 30, 1953: net income, $1,087,420, equal to $2.00 a common share, contrasted with $3,354,511, or $4.48 a share, in the preceding fiscal year.

Blaw-Knox Co., Pittsburgh, Pa. Nine months ended September 30, 1953: net profit, $3,056,927, equal to $2.17 a share, against $2,865,881, or $2.03 a share, a year earlier; net sales $87,500,000, against $71,700,000.

The B. F. Goodrich Co., Akron, O. Nine months to September 30, 1953: net income, $25,201,898 equal to $6.01 each on 4,191,979 common shares, compared with $23,008,681, or $5.36 each on 4,162,568 shares, in the like period of 1952; consolidated net sales, $520,654,622, against $453,938,658.

U. S. Imports, Exports, and Reexports of Crude and Manufactured Rubber

Imports for Consumption of Crude and Manufactured Rubber

	July, 1953 Quantity	Value
UNMANUFACTURED, LBS.		
Crude rubber	107,454,492	$22,599,799
Latex	14,987,249	3,845,099
Balata	357,533	79,349
Jelutong or Pontianak	147,843	59,003
Gutta percha	90,030	48,868
Crude chicle	8,034	3,215
Synthetic rubber	2,219,486	499,355
Reclaimed rubber	652,508	34,352
Scrap rubber	3,126,319	114,068
TOTALS	129,043,494	$27,283,108
MANUFACTURED		
Rubber tires		
Auto, etc. no.	7,643	$479,475
Bicycle no.	6,619	6,860
Other no.	1	87
Inner tubes:		
Auto, etc. no.	1,124	7,445
Footwear		
Boots prs.	2,016	5,278
Shoes and overshoes prs.	29,748	12,760
Rubber-soled canvas shoes prs.	3,480	877
Athletic balls		
Golf no.	33,120	9,139
Tennis no.	42,480	11,730
Other no.	18,619	3,155
Toys	.....	36,245
Hard rubber goods		
Combs no.	31,704	2,609
Other	.....	11,115
Rubberized printing blankets lbs.	785	1,608
Rubber and cotton packing lbs.	2,852	4,396
Gasket and valve packing	.....	7,384
Molded insulators	.....	6,802
Belting lbs.	1,900	3,792
Hose and tubing	.....	10,698
Gloves prs.	60,222	15,894
Nipples and pacifiers gr.	1,300	2,208
Instruments doz.	4,860	14,258
Heels and soles lbs.	5,190	2,563
Bands lbs.	3,070	2,000
Other	.....	500
Gutta percha manufactures lbs.	8,955	7,661
Other soft rubber goods	.....	173,447
TOTALS	.....	$839,986
GRAND TOTALS, ALL RUBBER IMPORTS	.....	$28,123,094

Exports of Domestic Merchandise

	July, 1953 Quantity	Value
UNMANUFACTURED, LBS.		
Chicle and chewing gum bases	332,873	$114,489
Balata, gutta percha, etc.	500	1,263
Synthetic rubbers		
GR-S type	1,712,213	453,439
Butyl	9,931	2,299
Neoprene	2,027,811	877,813
Nitrile type	528,689	275,089
Other	28,574	21,157
Reclaimed rubber	1,806,982	158,589
Scrap rubber	1,257,306	54,906
TOTALS	7,704,879	$1,959,044
MANUFACTURED		
Rubber cement gals.	61,212	$124,908
And rubberized fabric sq. yds.	131,403	128,631
Clothing	.....	134,526
Footwear		
Boots and shoes prs.	15,859	47,123
Rubber-soled canvas shoes prs.	24,342	45,961
Heels doz. prs.	42,541	52,818
Soles, soling, toplift sheets lbs.	680,346	170,457
Gloves and mittens doz. prs.	10,883	44,896
Drug sundries	.....	226,327
Toys, balls, novelties	.....	57,236
Hard rubber goods		
Battery boxes no.	13,188	20,033
Other electrical goods lbs.	90,516	56,812
Other	.....	19,951
Rubber tires and casings		
Truck and bus no.	54,364	2,458,701
Auto and motorcycle no.	82,784	982,722
Aircraft no.	2,780	214,066
Off-the-road no.	10,074	1,018,030
Farm tractor no.	4,383	214,165
Implement no.	3,539	36,914
Other no.	9,642	41,514
Inner tubes		
Auto no.	34,083	70,292
Truck and bus no.	30,696	141,110
Aircraft no.	2,013	22,319
Other no.	17,872	31,198
Solid tires: truck and commercial no.	2,801	43,775
Tire repair material		
Camelback lbs.	466,128	136,934
Other lbs.	339,541	267,353
Tape, except medical and friction lbs.	36,690	27,967
Belting		
V-type, auto, fan lbs.	91,823	127,926
Transmission		
V-type lbs.	93,867	184,731
Flat belts lbs.	44,454	65,548
Conveyor and elevator lbs.	141,071	126,649
Other lbs.	14,009	20,792
Hose		
Molded and braided lbs.	258,957	211,391
Wrapped and hand built lbs.	112,914	103,266
Other hose and tubing lbs.	81,794	92,961
Packing		
Sheet type lbs.	26,177	14,298
Other lbs.	130,230	168,862
Tiling and flooring lbs.	143,990	39,431
Mats and matting lbs.	328,614	105,010
Thread		
Bare lbs.	10,944	21,400
Textile covered lbs.	21,772	65,241
Compounded rubber for further manufacture lbs.	631,972	207,028
Other rubber manufactures	.....	451,954
TOTALS	.....	$8,843,227
GRAND TOTALS, ALL RUBBER EXPORTS	.....	$10,802,271

Reexports of Foreign Merchandise

UNMANUFACTURED, LBS.		
Crude rubber	1,335,954	$370,533
Balata, gutta percha, etc.	2,492	822
Scrap rubber	20,507	5,101
TOTALS	1,358,953	$376,456
MANUFACTURED		
Rubber boots and shoes prs.	320	$910
GRAND TOTALS, ALL RUBBER REEXPORTS	.....	$377,366

SOURCE: Bureau of the Census, United States Department of Commerce, Washington, D. C.

United States Rubber Statistics—August, 1953

(All Figures in Long Tons, Dry Weight)

	New Supply: Production	Imports	Total	Distribution: Consumption	Exports	Month-End Stocks
Natural rubber, total	0	37,507	37,507	38,529	567	109,059
Latex, total	0	6,649	6,649	5,203	0	10,273
Rubber and latex, total	0	44,156	44,156	43,732	567	119,332
Synthetic rubbers, total	*59,949 †8,350	570	68,869	59,241	1,975	169,152
GR-S types‡	*52,810 †94	507	53,411	47,018	820	134,936
Butyl	*7,139	63	7,202	5,551	3	20,269
Neoprene‡	†6,610	0	6,610	5,357	895	10,008
Nitrile type‡	†1,946	0	1,646	1,315	257	3,939
Natural rubber and latex, and synthetic rubbers, total	68,299	44,726	113,025	102,937	2,542	288,484
Reclaimed rubber, total	22,532	75	22,607	22,666	838	30,318
GRAND TOTALS	90,831	44,801	135,632	125,603	3,380	318,802

*Government plant production.
†Private plant production.
‡Includes latices.
SOURCE: Chemical & Rubber Division, NPA, United States Department of Commerce, Washington, D. C.

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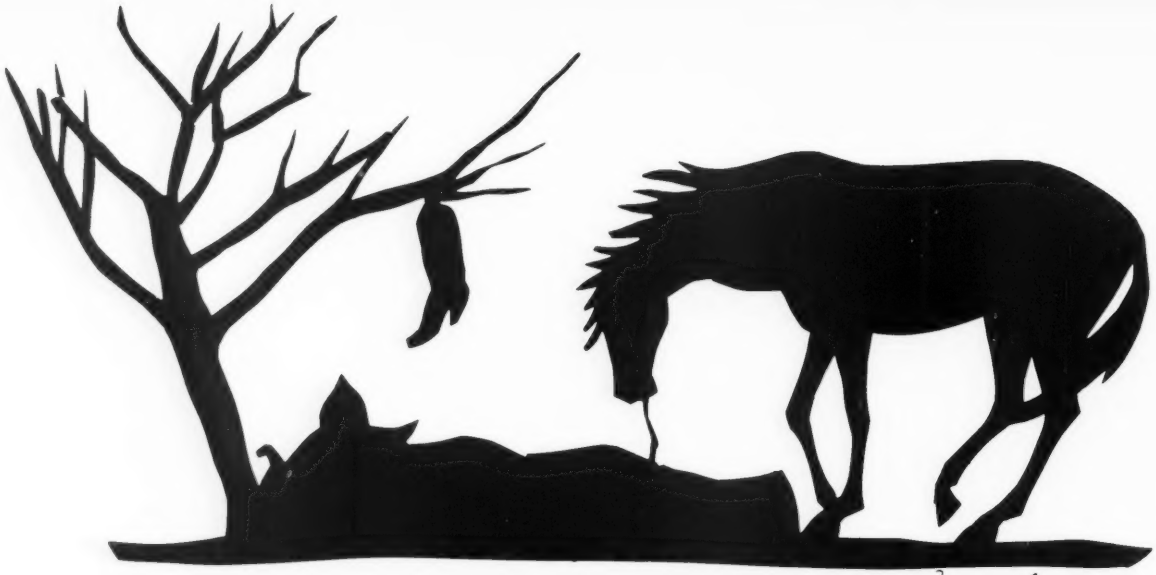

Paul Le May

"...as sure as Christmas"

Regardless of conditions you can be "as sure as Christmas" when you depend on the Sid Richardson Carbon Co. for both your current and your future supplies of channel black.

The continual diversion of natural gas from plants to pipe lines foretells an eventual shortage of channel black. Our own extensive supplies of natural gas and other resources, plus the world's largest channel black plant, enable us to assure you a *constant supply* of top-quality, uniform, economical-to-use **TEXAS "E"** and **TEXAS "M"** channel blacks.

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CHANNEL BLACKS

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CARBON CO.

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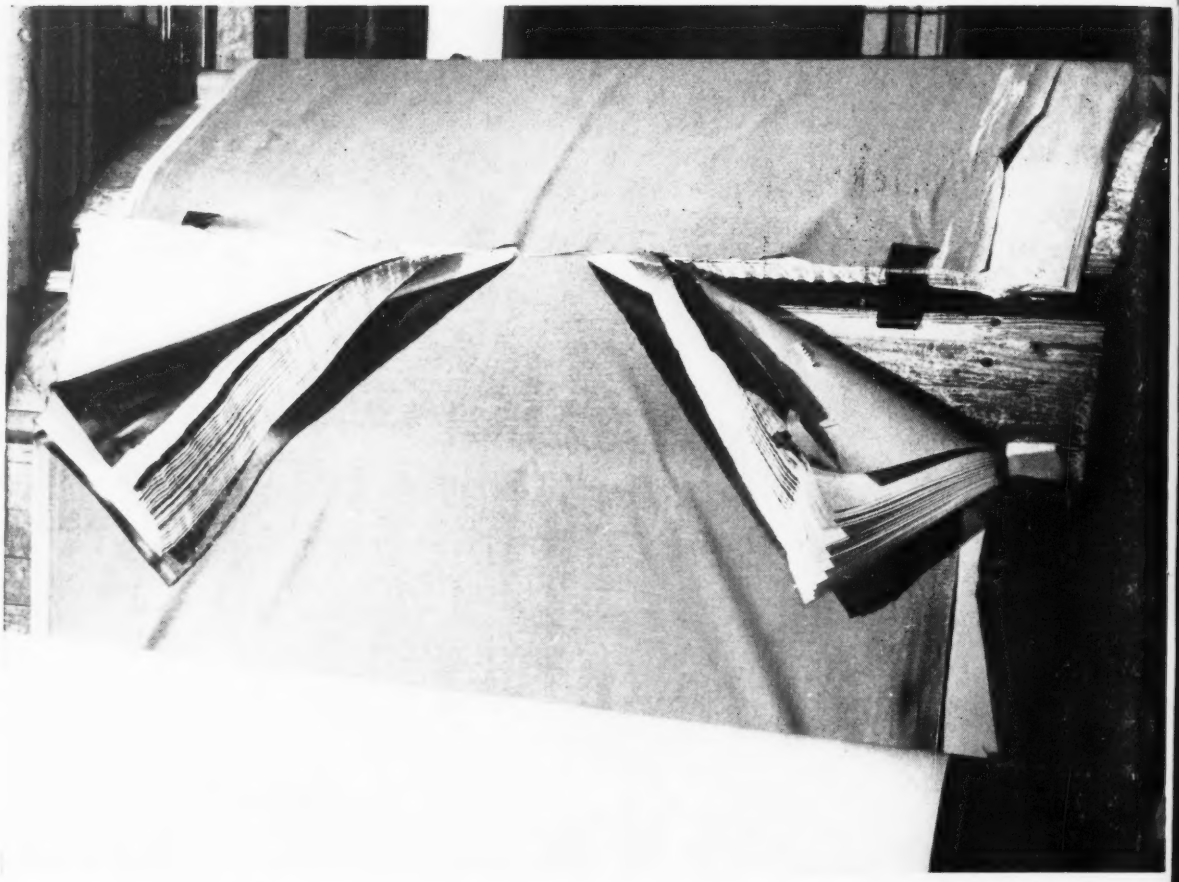

LINERETTE PLIES UP PROFITS

Linerette separating paper plied up with frictioned stock before being cut in the clicking operation, saves time and money. Since 1925 Linerette, the specially processed separating paper, has been used with steadily increasing acceptance. It assures clean, fast separation without adhesion and contains no oil or wax. Here is how Linerette can help you:

- Preserves tack.
- Protects lightweight stock in shipment—no fabric needed.
- Keeps stock free of cloth marks or impressions.
- Clippings may be mixed with scrap and worked away when used in die-cutting operations.
- Where cleanliness is essential, Linerette is a low cost lining for trays and containers.
- Stocks can be calender-fed into it.
- Used with most types of lightweight stocks in sheets or strips.

Linerette is available in any width up to and including 54," in rolls of 9", 11½", 13" and 15" diameters, on cores of 3" i.d. The yield is approximately six square yards to the pound. A 9" roll contains 375 linear yards and a 15" diameter about 1150 linear yards. Ask for a sample today, just specity desired width.

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